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Journal of the Society of Arts.

FRIDAY, MAY 17, 1861.

INTERNATIONAL EXHIBITION OF
1862.—GUARANTEE DEED.

The Council beg to announce that the Guar-

antee Deed is now lying at the Society's House for signature, and they will be much obliged if those gentlemen who have given in their names as Guarantors, will make it convenient to call there and attach their signatures to the Document. Signatures for sums amounting in the aggregate to £403,200, have already been attached to the Deed.

GUARANTEE FUND FOR THE EXHIBITION OF 1862.

The following additions have been made since the last announcement, in the *Journal* for May 10 :—

* * *The name marked with an asterisk is that of a Member of the Society of Arts.*

NAMES.	AMOUNT.	REPRESENTING THE OBJECTS OF THE SOCIETY—ARTS, MA- NUFACTURES, AND COMMERCE.
Robinson, Bellville, and Co., 64, Red Lion-street, Holborn, W.C. ...	£100	Commerce.
*George Morgan, 2, Danes-inn, Strand, W.C. ...	100	Arts.
C. E. and J. E. Potter, Belgrave Mills, Darwen, Lancashire ...	500	Manufactures.
John Cabell, Stoke Wesly, Bromsgrove ...	100	Arts.
Wilkinson, Heywoods, and Clark, Battle Bridge, N. ...	500	Manufactures.

By ORDER,

P. LE NEVE FOSTER, *Secretary*.INTERNATIONAL EXHIBITION OF
1862.

Her Majesty's Commissioners have received information that Local Committees have already been formed at the following places :—

BATH.
James Tunstall, Esq., M.D., Secretary.

BELFAST.
James Musgrave, Esq.,
Robert Lloyd Fatterson, Esq., } Honorary Secretaries.

BIRMINGHAM.
Arthur Ryland, Esq., Mayor, Chairman.
Edward John Payne, Esq., Secretary.

GLoucester.
The Mayor, Chairman.
Rev. C. Y. Crawley, Honorary Secretary.

GRAVESEND.
The Mayor, Chairman.
G. E. Sharland, Esq., Town Clerk, Secretary.

GREAT TORRINGTON.
The Mayor, Chairman.
George Doe, Esq., Town Clerk, Secretary.

HERTFORD.
Philip Longmore, Esq., Town Clerk, Secretary.

NEWARK.
The Mayor, Chairman.
T. F. A. Burnaby, Esq., Town Clerk, Secretary.

NEWCASTLE-ON-TYNE.
Robert C. Carr, Esq., Secretary.

STAFFORD.

The Mayor, Chairman.
— Austin, Esq., Secretary.

STAFFORDSHIRE POTTERIES.

Fred. Bishop, Esq., Hanley, Secretary.

STOCKTON-ON-TEES.

Robert Thompson, Esq., Chairman.
Joseph Laing, Esq.,
James Bowron, Esq., } Honorary Secretaries.

WALSALL.

The Mayor, Chairman.
Wm. Franklin, Esq., Honorary Secretary.

The following arrangements (in addition to those published last week) have been made in foreign countries to represent the interests of intending exhibitors :—

ANHALT (DESSAU).

Dr. Lange, Dessau, Commissioner.

HANOVER.

The Directors of the "Gewerbe Verein," and the Committee of the "Kunst Verein" are appointed Commissioners.

MECKLENBURG SCHWERIN.

Mons. le Comte de Schlieffen à Schlieffenburg, Güstrow, and Mons. Dippe, Conseiller Grand Ducal au Département des Affaires de Commerce et d'Industrie à Schwerin, have been appointed Commissioners.

MECKLENBURG STRELITZ.

The Government of the Grand Duke.

SAXE COBURG GOTHA.

His Excellency the Minister of State will act as Commissioner.

SAXE MEININGEN.

The Ducal Officers are appointed Commissioners.

SAXONY.

Dr. Weinlig, Chef de division du Ministère de l'Intérieur, Dresden, Commissioner.

SPAIN.

The Minister of Public Works will attend to communications.

SWITZERLAND.

Le Département de l'Intérieur—Section Bureau de Statistique—Berne.

CONVERSAZIONE.

The Second Conversazione of the present Session will be held on Saturday, the 1st June, at the South Kensington Museum. The card for this Conversazione will admit the Member and two ladies, or one gentleman.

ANNUAL DINNER.

The One Hundred and Seventh Anniversary Dinner of the Society will take place at the Crystal Palace, Sydenham, on Wednesday, the 19th June, at 5 o'clock, punctually. The Right Hon. the Earl of Elgin and Kincardine, K.T., G.C.B., will preside.

Members and their friends are invited to be present.

TWENTY-SECOND ORDINARY MEETING.

WEDNESDAY, MAY 15, 1861.

The Twenty-Second Ordinary Meeting of the One Hundred and Seventh Session was held on Wednesday, the 15th inst., Lord Elcho, M.P., in the chair.

The following gentlemen were proposed for election as members of the Society:—

Adams, George William	Montague-house, Addison-road, Kensington, W.
Balleras, Guillermo Esteban	Seville-villa, Carlton-hill, St. John's-wood, N.W.
Brown, J. W.	7, Upper Hyde-park-gardens, W.
Christy, Samuel	21, St. James's-place, S.W.
Clements, W.	Cream-hall, Highbury-vale, N.
Cropey, J. F.	2, Kensington-gate, Hyde-park South, W.
Crossman, Robert	29, Westbourne-terrace, W.
Edwards, William	Denmark hill, S.
Follett, Robert B.	25, Norfolk-crescent, W.
Forrest, John	6, Highbury-crescent West, N.
Gregory, Thomas	212, Regent-street, W.
Hannay, Robert, jun....	Springfield, Ulverston.
Hare, Sir John, F.G.S.	Clifton, Bristol; and Chateau d'Hardelet, près Samer, Boulogne.
Hurlstone, F. Y.	9, Chester-street, Belgrave-square, S.W.
Jodrell, the Rev. Sir Edward Repps, Bart., M.A.	64, Portland-place, W.; Sale-park; and Saxlingham Rectory, Norfolk.

Mocatta, Benjamin.....	29, Gloucester-square, Hyde-park, W.
Oxenham, Hugh	353 & 354, Oxford-street, W.
Ryder, William Henry	17, New Bond-street, W.
Simpson, T. A.	154, Regent-street, and 8, Beak-street, W.
Stagg, George	2, Craven-hill-gardens, W.
Stocken, Frederic	5, Halkin-street, Grosvenor-place, S.W.

The following candidates were balloted for and duly elected members of the Society:—

Arundel, John	Clapham-park, S.; and 1, Gutter-lane, Cheapside, E.C.
Crawford, John, F.R.S.	21, Wilton-street, S.W.
Fisher, Charles	Whitehaven.
Sedley, Angelo James	40, Langham-street, Portland-place, S.W.
Simpkinson, Francis	67, Victoria-street, Westminster, S.W.
Sone, John	23, Fenchurch-street, E.C.
Sworder, Thomas	Bedford-road, Luton.

The Paper read was—

ON THE HYTHE SCHOOL OF MUSKETRY INSTRUCTION IN RIFLE SHOOTING.

By JOHN MACGREGOR, CAPTAIN, LONDON SCOTTISH RIFLE VOLUNTEERS.

The Arms Factory at Enfield and the Musketry School at Hythe are two important establishments added to our defensive resources within the last seven years.

Iron, brass, and wood are taken to the factory, and in one week 2,000 rifles can be produced.* Men with good sight and of ordinary intelligence begin at the school, and in one week they learn to hit an enemy at half a mile.

Enfield and Hythe are complements one of the other, for men without proper instruction would make bad shooting with good rifles, and the best teaching would be thrown away on bad arms.

The object of this paper is to describe how men are taught to shoot under the Hythe system, but we shall not need to enter at all upon the comparative merits of the fire-arms they use, for the mode of shooting with them is

* The long Enfield rifle of 1853 weighs 9 lbs. 3 ozs. The barrel is 3 feet 3 inches long, and has three grooves, with a spiral of one turn in 6 feet 6 inches, and a bore of .577 inch, carrying a bullet of .568 diameter, and 530 grains weight, with a charge of 70 grains of powder. The grooves are 15 thousandths of an inch deep at the breech, and 5 thousandths deep at the muzzle. The following Table is from the "Volunteer Service Gazette":—

Description.	Weight. lbs. oz.	BARREL.		Diam. of Bore. in.	Windage. in.
		Length. ft. in.	...		
Long Enfield .	4 4 ...	3 3 ...	...	.577 ...	.027
(Machine made.)					
Short Enfield.	3 12½ ...	2 9 ...	...	.577 ...	.027
Engineers .	3 10½ ...	2 9 ...	...	.577-.589 at muzzle	.027
(Lancaster)				.580-.592 at breech	
Navy . . .	4 2½ ...	2 9 ...	...	.577 ...	.027

GROOVES.

No.	Width.	Depth.	Description.	Spirality.
3 ...	.262	{ .005 to .015 }	Twist Uniform.	1 turn in 78 in.
3 ...	.262	.014	Depth Progressive.	
-	-	-	Uniform.	1 turn in 78 in.
-	-	-	Elliptical.	Gaining Twist.
5 ...	-	-	Uniform.	1 turn in 48 in.

Bullet, wood plug—length, 1.09 in.; diameter, .55 in.

Weight of bullet, 530 grs.; charge of powder, 2½ drs. There are 58 parts of a rifle; on an average each part goes through 30 operations, or about 1,500 operations in all. The expenditure at Enfield last year was at the rate of about £2 for every rifle manufactured. Rifles of the Enfield pattern are produced also at private factories. The largest of these, that of the London Armoury Company, in Bermondsey, can turn out 400 stand a week.

almost the same for all. There are also other numerous adjuncts of rifle shooting which, though intimately connected with its practice, and the subjects of experiments at Hythe, are not within the scope of this paper. We shall, therefore, not dilate on the construction of the rifle in the stock, lock, and barrel, or the slings and sights, the form, materials, and size of the powder, bullet, and caps, the nature of ground for ranges, or the butts, mantlets, targets, signals, and registers.

If, then, we limit our consideration to the essentials taught at Hythe for the effective use of the Enfield rifle, we find they consist of instruction given to the mind, the eye, and the limbs.

The mind is taught the reason for rules, and their application, so as to load, fire, and clean the rifle with speed, precision, and safety.

The eye is taught to judge the distance of an object, and to aim at it.

The limbs are taught readily to assume a position which shall be steady during fire, and the limbs and eye are tutored so to act in unison under the mind, as that the finger presses the trigger during a short instant, while the body steadies the rifle, and the eye brings three points into one line.

Shooting with the Enfield rifle is different from shooting with a musket, because in the latter, mental calculation as well as aim with the eye is required at the moment of firing, whereas with the new arm, as much as possible of the mental process is accomplished beforehand by him who judges the distance, by him who constructs the sights, and by him who, in adjusting them, (before aiming), allows for the present circumstances as to strength of powder and of wind. Again, learning to shoot at Hythe is like learning to write by copy, beginning with the slowest and simplest strokes; whereas the common mode of becoming a good shot with a fowling-piece is like that of him who, with a genius for drawing, rapidly dashes off a series of sketches from fancy, almost without rule, and thus gradually arrives at success by instinct and practice, without knowing precisely why his first efforts were failures.

The perfection of the Enfield rifle, and the excellence of the system of Hythe shooting, will be better appreciated if we glance briefly at some of the fire-arms of former days and the modes of using them.

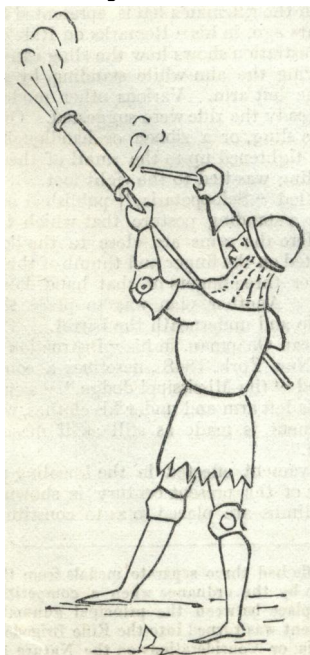


FIG. 1, A.D. 1430.

Fig. 1 represents the earliest representation I can find of the manner of firing a "hand gun." This was at the siege of Lucca, in 1430.* The barrel is fixed on a stick, held under the right arm, while the right foot is advanced and the right hand applies a match.

About 60 years later, a similar gun was used on horse-back at the siege of Fournice, in 1495, (see fig. 2). The barrel was supported by a swivel rest from the saddle, and the stock hung against the breast by a band round the neck. In this manner also the matchlocks with short stocks were used.

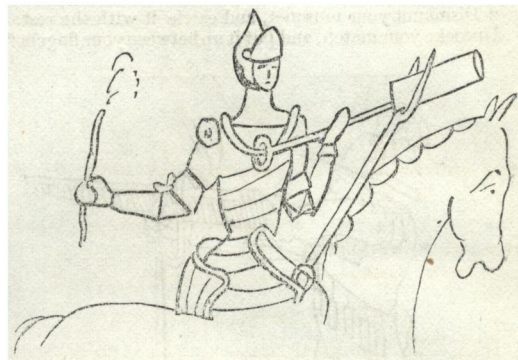


FIG. 2, A.D. 1495.

The matchlock was an improvement on these ruder weapons; but for a long time it was inferior to the English bow in range, accuracy, quickness, and convenience.

Markham, in his "Soldier's Accidence" (1625),† says:—"As touching the postures which belong to the musquet, they are fortie in number, and are to be done:—5 standing, 3 marching, 18 charging, and 14 discharging. "The postures to be performed in charging (loading) are these‡:—

Clear your pann.
Prime your pann.
Shut your pann.
Cast off your loose cornes (the loose powder not covered in the pan).
Blow your pann.
Cast about your musquet with both your hands, and traylor your rest.
Open your charges.
Charge your musquet with powder.
Draw out your scoureing sticke (ramrod).
Shorten your stickie.
Ramme in your powder.
Draw out your stickie.
Charge with bullet.
Draw out your stickie.
Shorten your stickie and put it up.
Bring your musquet forward with your left hand.
Hold it up with your right hand, and recover your rest.

"The postures which are to be performed in discharging are these:—

Carrie your rest in your left hand, preparing to give fire.
Sloope your musquet, and let the rest sink.

* Class Book for the School of Musketry, by Col. Wilford, 1860, p. 74. The matchlock now produced, from Mr. Bishop, of Bond-street, is also held under the arm. A gun-barrel, without a lock, fixed on a bludgeon and fired by a piece of lighted peat turf, was used lately in the wild parts of Ireland. (That now on the table was captured by the police in Galway.)

† "The Soldier's Accidence; or, an Introduction into Military Discipline," by Gervaise Markham.

‡ The exercises here described, as well as those which follow in this paper, were performed at the meeting by Sergeants Smith, Lockie, and Turner of the Left Highland Company of the London Scottish Volunteers, of which company Mr. MacGregor is Captain.

In the right hand poize your musquet.
 In the left hand carrie the musquet, with the rest.
 In your right hand take the match, between the second finger and the thumb.
 Hold the match fast, and blow it.
 Cocke your match.
 Trie your match.
 Guard the pann, and blow your match.
 Open your pann.
 Present your musquet.
 Give fire."
 The conclusion of this tedious business was as follows :—
 " Dismount your musquet, and carrie it with the rest.
 Uncocke your match, and put it up between your fingers."



FIG. 3, A.D. 1608.

Fig. 3 shows a musquetaire's position at the command " Give fire," in 1608, where we observe that the butt rests against the shoulder, the right arm is elevated, the left arm steadies the rest, and the left foot is advanced. The whole position resembles that now adopted more than several of those employed between this early period and our own. And even at that time the importance of individual attention in firing, rather than of mere simultaneous volleys, seems to have been recognised better than it was afterwards, for the same author says :—" In teaching to give volleys, the ancient and vulgar manner of discipline (which is, that the whole volley shall be given of all the shot in one battalion or troop at one instant) is utterly to be condemned, which only serves to make a great crack."

An arquebusier of 1632 is represented firing on horseback, by Hewit, in his " Ancient Armour and Weapons in Europe," and several interesting sketches of the use of the matchlock are given in the work on " Military Antiquities," by Francis Grose, who died at the end of last century.

Passing over more than a century, we find the position represented in Fig 4, adopted just one hundred years ago, as that of the front rank when there were three ranks in the formation.* In this it will be seen that the right arm is

close to the body, the left arm is extended and off the knee, while the body is not supported by the right heel—a defective position in all these particulars, and yet it was retained until within the last few years.



FIG. 4, A.D. 1759.

After the preparatory caution, " Take care to perform the manual exercise!" the following were the words of command :—

" As front rank make ready!" (Right thumb on cock, step back three feet with right foot, and kneel on right knee, butt on ground, and cock.)

" Present!" (Both arms close to body; right forefinger on trigger.)

" Fire!" (Draw your trigger strongly and at once with the forefinger.)

In the *Scots' Magazine*, for 1776, we read, " Their majesties attended a review of the riflemen yesterday, and were much pleased with the dexterity of the officer, who loaded and fired several times in a minute, and hit the mark each time. He lies upon his back when he discharges his piece." In some cases at present this position is necessary, and with many persons it is found convenient, but the difficulty of loading, and the time and exertion required when skirmishers have to fire as they advance or retire, seem to make this position less desirable than the kneeling one adopted.

The position of lying on the front of the body, and resting the rifle on the rifleman's hat is represented by Ezekiel Baker, 50 years ago, in his " Remarks on Rifle Guns."*

Another illustration shows how the sling can be used to help in steadying the aim while standing, by slipping its loop under the left arm. Various other modes of using the sling to steady the rifle were suggested. One of these was to put the sling, or a ribbon or handkerchief round the neck, and tightened up to the small of the butt. In another the sling was tied to the right foot.

A work called " Scloppetaria,"† published in 1812, recommends for a standing posture that which is sketched in Fig. 5. Here the arms are close to the body. The rifle is supported on the finger and thumb of the left hand, while the other three fingers of that hand keep a strain on the sling. Another plan was to place the ramrod against the hip and underneath the barrel.

The American Chapman, in his " Instruction to Young Marksmen" (New York, 1848), describes a concealed apparatus, called " the Mississippi dodge," " a jointed rest attached to his left arm and under his clothes, which, by a simple movement, is made as still as if mesmerised or case hardened."

The improvement effected in the kneeling position at the beginning of the present century is shown in Fig. 6, in which the limbs are placed so as to constitute a frame

* See " A Plan of Discipline for the Use of the Norfolk Militia, in 3 parts. * * * By William Windham, Esq., and the Right Hon. George Lord Viscount Townshend, Lord Lieutenant of Ireland. 2nd edition. Printed for J. Millan, bookseller, near Whitehall, 1768. Dedicated to the Right Hon. the Earl of Shaftesbury, and the other noble lords who have exerted themselves in their respective Counties as Lord-Lieutenants in execution of the Militia Act." In 1806 three ranks were used, the rearmost loading only, and then handing the firelock to the other.

* Baker's rifle had three separate medals from this Society, and was chosen by the ordnance when a competition, invited in 1800, took place between the principal gunmakers, before the 95th regiment was turned into the Rifle Brigade.

† Scloppetaria, or Considerations on the Nature and Use of Rifle barrelled Guns, by a Corporal of Riflemen. London, 1812.

of triangles, which is really the main feature of a rest or steadying apparatus. In this, it will be seen that the

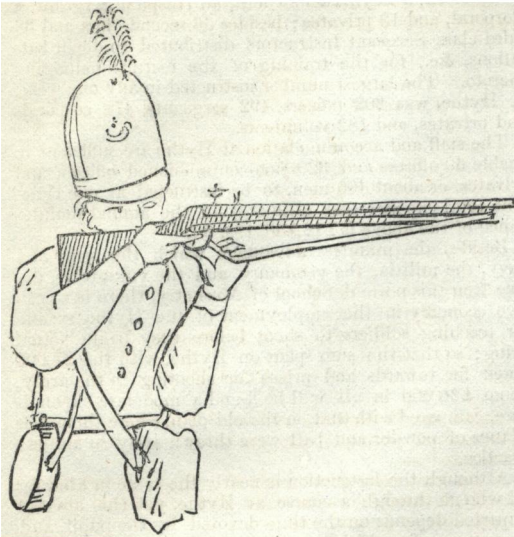


FIG. 5, A.D. 1812.

riflemen, 50 years ago, applied the left elbow to the knee, which was a great improvement on the position of 1759.



FIG. 6, A.D. 1804.

The positions in fig. 7 are those ordered for the French army, as represented in the "Ordonnance du Roi du 22 Juillet, 1845, sur l'exercice et les manœuvres des bataillons de Chasseurs à pied." (Paris, 1852.)

In the standing position, the right arm is raised, the left hand is quite close to the trigger-guard, the feet are in the direction of "right face," with the heels separated.

The American position, as described by Chapman, was the same in 1848 as the French, except that the left arm was more extended, as in the English plan.

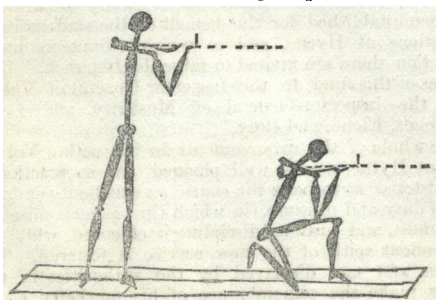


FIG. 7, FRENCH, A.D. 1852.

In the French kneeling position (Fig. 7), it will be observed that the left elbow is in rear of the knee, and the hand is bent inwards, almost as in that shown from Scloppetaria.

Such are some of the various attitudes in which men have hitherto made use of fire-arms. Before we describe the Hythe positions it is necessary to say a few words on the use of the artificial rest which was common with the olden fire-arms. The Swiss still encourage the practice, the Tyrolese use the shoulder of a comrade as a rest, which is both natural and artificial. The following just remarks were written in Scloppetaria 50 years ago:—"It is too much the plan among volunteer rifle corps to begin with practising the men from the rest and not from the shoulder, which seems like beginning at the wrong end."

In the target practice of the French tirailleurs they fire two from shoulder and one from rest. In the British army one round at each of the four distances in preliminary firing is directed to be fired from a rest. This is to give confidence to the recruit. An artificial rest is, however, necessary for sighting a rifle, as well as to practice the rifleman in a mode of firing he has frequently to adopt in actual warfare. The portable rest now exhibited was invented by Lord Elcho, and is much approved. The Hythe positions are, in fact, devices to use the body as a "rest," portable, steady, and ever at service. The rest shown by Mr. Lancaster was used for firing one of his rifles at 4,500 yards (more than two miles and a half). In this position the foresight is on a bar pendent from the muzzle. The fixed rest is used for firing a rifle when it is required to be kept perfectly steady.

Fig. 8 (next page) represents the standing and kneeling postures according to the regulations now in force for the British Army. The excellence of these positions is made plain by comparing them with any others, bearing in mind that the position of a soldier must be steady, and convenient for loading and firing in close order, and in skirmishing.

In the standing position, the left foot points straight to the front. The whole body is thus free to sway backwards on the left ankle joint when the recoil takes place, and thus the barrel recedes in a circle of the largest radius. The right foot points to the right at right angles with the left. The long Enfield rifle appears to balance on the left hand at just that distance from the butt where a man, 5 feet 10 inches in height, and with average breadth of shoulder, finds his left hand can hold the rifle so as to be most steady.*

The right arm is raised to make the shoulder a convenient bed for the butt, while the right hand is placed so as to keep its muscles free to put the fore-finger on the trigger, and to obey the mandate from the brain, by which the trigger is slowly but certainly squeezed into action.

In the Hythe kneeling position, the body is supported on three points almost equidistant. The recoil is again made to thrust the body truly to the rear, turning on the left ankle, and thus keeping the barrel nearly horizontal. The right foot, which ought to wear a thick, stiff boot, supports the body as a seat. The left hand balances the rifle, and a hollow in the bent elbow comfortably fits the front of the raised knee-joint. The right hand is free as before.

In both these positions a slight stoop of the head enables the eye to align the sights and the bull's-eye, and at the same time to see that the sights are themselves vertical.†

* Several different lengths of butts are being prepared for issue to the army, so as to remedy the present mistake of endeavouring to get tall and short men to shoot equally well with the same stock.

† The back-sight in the long Enfield rifle is acknowledged to be too near the eye, but this awkward position is in part due to the necessity for keeping the flap out of the way of the hand in trailing arms. The notches of the flap and slides are capable of improvement by bevelling them off with a file. The importance of keeping the centre of the notch vertically over the line

The establishment at Hythe was formed in 1853, to teach the army how to use the rifle in the positions we have described. The school and barracks are situated on

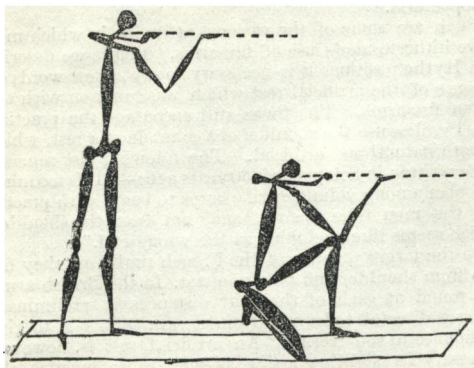


FIG. 8. HYTHE, A.D. 1861.

a rising ground, about a mile from the sea, and overlooking a gravelly plain, which was used even in olden times for training in the art of war.

All discerning persons who have to do with the Hythe School of Musketry, must acknowledge that the personal qualifications of the Officers and Staff are as excellent as the system they adopt and the arm they teach us to use. Major-Gen. Hay combines all the qualities requisite for so important a command. The enthusiasm of Col. Wilford is soon imparted to those who attend his instructions. The other officers have been selected with similar aptitude for their duties, and they are assisted by the sergeant instructors with cheerful and persevering energy.

The Staff of the School of Musketry consists of the Supervising Branch, including the Inspector-General of Musketry and Commandant, a Captain and Deputy-Assistant, Adjutant-General, two Sergeants as clerks, all at Hythe; besides nine Captains and Inspectors of musketry, distributed at home and in the colonies, to superintend the training of the troops.

There are also, at the head-quarters, a Major Assistant Commandant and Chief Instructor, two Captain Instructors, two Lieutenant Assistant Instructors, an Adjutant and Quarter-master, a Paymaster, a Surgeon, and an

Armourer (civilian). A Sergeant-major, a Quarter-master Sergeant, nine first-class Sergeant instructors, an orderly-room Clerk, a Paymaster's Clerk, an Hospital Sergeant, a Corporal, and 18 privates; besides 36 second-class and 36 third-class Sergeant Instructors distributed to dépôt battalions, &c., for the training of the recruits belonging thereto. The largest number instructed in any one year, at Hythe, was 202 officers, 492 sergeants, 478 corporals and privates, and 182 volunteers.

of fire is not fully realised by a beginner. The Americans sometimes allow for the action of a side-wind by inclining the sight to one side. A discussion was continued for several days at the mess of a Rifle regiment, some years ago, on the question whether inclining the sight to the right would deflect the ball to the right or left. The twist in the grooves of a rifle has a tendency to turn the barrel on its axis when it is fired, and this depends on the weight of the ball and the velocity with which it is caused to rotate. This angular velocity varies in different rifles. It is stated to be 453 turns in a second in the Swiss Federal rifle, 422 in the Jacobs, about 600 in the American, with a gaining twist, and 900 in the Whitworth. If the Enfield ball has an initial velocity of 1,300 feet in a second, it would start turning 200 times on its axis in a second. It is understood that in the last Chinese expedition, many men neglected to adjust their sights when firing. Instruction in firing without elevating the sight forms part of the military teaching. In Cooper's "Practical Guide for the Light Infantry Officer," a target is described with three broad horizontal bars across it at equal intervals. The soldier is told to aim at the lowest of these when firing at from 100 to 200 yards, and at the highest of them when firing at 300 yards. The purpose of this is to accustom the soldier to aim always along the barrel, but at different points on the object, according to the distance. A sight for lateral adjustment in case of wind is exhibited by Mr. Lancaster. Several "sight-guards" are before the public. One is by Messrs. Silver, of Cornhill, and is made of ebony. Another, patented by Captain Jacques, of Manchester, can be speedily adjusted so as to allow the sight to be used in firing.

The staff and accommodation at Hythe are sufficient to enable 60 officers and 320 non-commissioned officers and privates, or about 400 men, to be instructed at one time. The total expense (per estimate) for the annual maintenance of the above is £12,138 19s. 8d.

Besides the manifest advantage which the army and navy, the militia, the yeomanry, and the volunteers, derive from this normal School of Musketry, there is a positive economy in the employment of the Hythe system for teaching soldiers to shoot before they begin actual firing; so that the sum spent on Hythe, with the £7,000 voted for rewards and prizes for shooting in the army, about £20,000 in all, will be found a moderate expenditure, compared with that on the old plan, where thousands of tons of powder and ball were thrown away in aimless practice.

Although the instruction is nearly the same in kind for all who go through a course at Hythe, yet the amount imparted depends on the time devoted by the pupil, and the purpose for which he comes to the School.

There is a "long course," occupying ten weeks, in which officers can be thoroughly instructed so as to teach whole battalions when they leave. Again, young officers and recruits, for their own individual practice, are now always compelled to attend about 50 lessons and drills, and 30 preliminary firing practices, in their several corps, while each drilled soldier has to attend about half as many every year before the regular annual course of musketry.

The advantage of the course at Hythe has been lately extended to the Volunteers of Great Britain, and they have accepted with alacrity and encouraging results this most important opportunity of learning how to shoot. Seven bodies of Volunteers have availed themselves of the course, by which 100 members of different corps can be taught at once, and the whole of the instruction and firing is finished in 14 days.

It is understood that there are now names entered on the list of expectants which would fill up the classes for the next three years. The necessity for another school of musketry similar to that of Hythe, but situated in the North of England, has been increased by the eager manner in which the volunteers have thus come forward, and it is likely soon to be met by the inauguration of a northern branch. On this occasion I cannot refrain from suggesting to the National Rifle Association that they should seriously consider whether their assistance, advice, and even supervision might not be extended to the instruction of volunteers in musketry as well as to the rewarding of good shots.

The instruction is given to volunteers without any fee or payment whatever, but with the sanction of the Commander-in-Chief a "Volunteers' Musketry Fund" has just been established for the benefit of the staff-serjeants and others at Hythe, and to which volunteers under instruction there are invited to subscribe 10s. each. The trustees of this fund are the Inspector-General of Volunteers, the Inspector-General of Musketry, and Lords Grosvenor, Elcho, and Bury.

The whole of the arrangements for instructing Volunteers at Hythe are so well planned, and so practically administered, as to make the course an excellent combination of duty and pleasure, in which time is economised to the utmost, and military discipline is observed, while the independent spirit of the new service is fostered. The wisdom and tact displayed by the authorities in this matter make the remembrance of his musketry course grateful to every volunteer. The pride we feel in being

thus treated by the army enhances the esteem with which every Englishman regards that noble profession, and as an earnest volunteer myself, I venture here to tender cordial thanks to those who devised the scheme for our instruction, and to those who have carried it out with such energy and spirit.

The method of instruction at Hythe consists in teaching the limbs by "position drill," which is carried on in the barrack-yard, while the eye is taught by aiming and judging distance drill, conducted on the sea-shore, and the mind is enlightened by explanatory lectures in suitable rooms fitted up with models and appropriate pictures.

For the physical training, the men are divided into sections of not more than ten each, under one instructor, for it is by individual practice that individual excellence is attained.

The explanations of the construction of the rifle, and of how to clean it, are imparted to squads separately.*

In the lecture room 100 men can be addressed at once, but it is not easy either to describe or to epitomise the mental instruction imparted at Hythe under the title "Theoretical Principles." In explaining the scientific part, the lecturer condenses, or expatiates, skims the surface, or explores the depths, according to the intelligence of his hearers and the time they can devote to the subject. In this manner the best information is imparted in the most lively, popular, and impressive style, on the construction of the rifle; the use, manufacture, and preservation of its several parts: the qualities of powder, and the making of cartridges; the circumstances affecting the explosion of the powder and the flight of the bullet; the proper way to conduct target practice; and the regulations for keeping shooting registers.

While there is no doubt that a man may shoot perfectly well at a fixed mark without knowing any of these matters, it is equally certain that a rational acquaintance with them is of great value in actual warfare, and is always interesting.

The aiming drill, or "eye drill," is conducted by causing the man under instruction to "lay" his rifle on a sandbag in a tripod rest, so as to align the two sights and the bull's eye of a distant target.† The instructor carefully observes the performance, corrects mistakes, and invites the observations and criticisms of the rest of the squad, of whom each in succession aims in the same manner. Two things are notable in this department:—

1. Very few men aim correctly at first.

2. Nearly every man with good sight can speedily learn how to aim correctly.

On the other hand, the ability to "judge distances" correctly is possessed by some persons to a high degree, whereas to acquire it is only possible for a limited number, and after much practice. Men accustomed to a country life, builders, surveyors, artists, and those whose occupation sharpens the eye in this faculty, very readily give excellent guesses at a man's distance, judging from his appearance alone. But for most persons unaccustomed thus to use their eyesight, a series of numerous trials is required.

In my opinion, the few lessons given in this department in the short course for volunteers at Hythe, are scarcely worth the time they employ, except for the system they exemplify, which the volunteers are thus instructed to carry into effect more at leisure in their respective corps.

The "judging distance" drill at Hythe is, however, a

most pleasant and interesting part of the course, for it involves many hours' marching in the breezy air of the sea, and over the shingly plain, under the wholesome excitement of competition between the sections, which are directed to march back to the barracks in the order of the merit of their performance during each day.

The eye is practised in judging distance by placing men at intervals of 50 yards, and causing each section to observe the appearance of the face and dress at known intervals, as well as the hue of the background and the state of the atmosphere. After this men are placed at unknown distances, and each pupil is directed to estimate the number of yards. The correct distance* is then declared, and "points" or marks are given to each man in proportion to the accuracy of his estimate.

"Position drill" consists of a series of motions by which the limbs and eye are trained to assume readily the best positions for firing, to remain there steady during fire, and to resume the position for reloading.

The importance of this part of the instruction cannot be exaggerated. The combination of muscles required for holding a rifle in the Hythe positions is not otherwise engaged in the ordinary operations of life, and it is different from those employed by the sportsman.

The exercise of these muscles, therefore, is necessary even to strengthen them, and much more to accustom them and the eye and mind to submit, without flinching, to the loud report, and violent shock, and brilliant flash, all of which are to take place at the exact moment, when perfect steadiness of the rifle is necessary for a good shot. The gentlemen who have kindly attended here this evening to go through this "position-drill" in your presence will exhibit it much better than any description in words.

The "first practice" is purely a gymnastic exercise for the body and limbs, without aiming.

In the second practice the head has a part, the eye takes aim, and the finger presses the trigger.‡ By aiming at the instructor's eye, the pupil enables him to correct numerous faults.

The third practice is to enable men to load, and fire in the ranks, without disturbing one another.

Over and over this exercise has to be performed, with strict attention to the placing of the feet, the poising of the body, the positions of the arms and head, and that magic sympathy between the rifle sights and the rifle-man's eye, trigger, and finger, which shall enable the whole to co-operate when the moment is seized by the brain for discharging the piece. This practice can be carried on even indoors, and without any instructor, yet with the most evident and speedy results in improving the shooting of everyone who devotes himself to its pursuit.†

The following extract from "Scloppetaria" shows that this private "powderless" practice was not unknown half a century ago:—

"We have heard many old shots say that they have derived great advantage from having their gun in a situation equally easy of access, to which they now and then apply the cheek and eye as if taking aim, and the consequence was, that when really firing, they felt so much accustomed to the stock and bend that the head went mechanically into the proper position."

After proficiency has been attained in the manner of loading and firing, the teachers introduce the pupil gradually to the use of ball cartridge, first by snapping caps,

* The importance of cleaning the rifle properly is evident on considering the functions performed by the grooves and "lands" of the barrel, and the delicacy and minuteness of the instrument. Last month General Hay found the mean deviation of an Enfield rifle in 21 shots, at 700 yards, was from 6 to 8 feet when not cleaned, but only 2 feet when cleaned. For first-rate shooting, the Americans clean the rifle after every shot.

† Old Roger Ascham, in "Toxophilos," says, concerning the crossbow, "The having a man's eye always on his mark is the only way to shoote straighte."

* An odometer, for measuring this without the tedious use of the chains, was exhibited from Mr. Newton's, in Fleet-street.

† Col. Wilford says this should be done "as if one had to squeeze one drop from an orange."

‡ Captain Cole's, or Mr. Layton's aiming card targets should be used. The Hythe kneeling position ought to be so practised as to become one of comfort, "in which a man may sit on his heel, shave and read the *Times*." The motto on the medal of the National Rifle Association is, "Sit perpetuum."

and then by firing blank cartridge. Baker, for a similar purpose, recommends sportsmen to fire at birds at first without shot.

After this, 20 rounds are fired by the recruit as preliminary ball practice, and then he is brought to the target for his regular class shooting, which is to be the test of the manner in which he has profited by the foregoing instruction. This preliminary ball practice does not form part of the course for the Volunteers, and, therefore, while time is gained, a very considerable advantage is lost which ought not to be forgotten when comparing the scores made by Volunteers and by the "Regulars" at Hythe. On the other hand, when soldiers are caused to fire with their bayonets fixed there is certainly a disadvantage, though it may be good practice for actual warfare. If the rifleman, who seldom fixes bayonets, is to shoot accurately without a bayonet, it seems quite clear that the position drill ought not to be conducted with the fixed bayonet.

Each section of ten men is taken separately to fire at the targets, and each man fires in succession, with every provision for his individual comfort and success. This actual practice at the target is not so much for instruction as to test, and therefore the instructors, at this point, cease to give minute directions, but leave the faults hitherto uncorrected to be spoken of at some less exciting period.* Each man fires only five rounds at each of two ranges, or ten rounds in one day, by which excellent arrangement both hurry and carelessness are prevented. As there are 12 distances, or ranges, it requires six days to go through the "individual practice." After this there are still three days for file, volley,† and skirmishing practice. So that in all at least 90 rounds of ball cartridge are expended in improving and testing the shooting of each man instructed. This, with 20 preliminary rounds, instead of those in the third period, 20 of blank cartridge, and 20 caps "snapped," constitute the whole of the ammunition consumed for a soldier recruit's course of musketry.

The most accurate register is made of the effect of each shot fired by every man; and the relative merits are estimated by strict but arbitrary rules‡ which regulate the length of ranges, the sizes and shapes of targets, and of the circles on them; the number of "points" for hits on the "bull's-eye," "centre," or "outer" parts, as well as

* The diagram exhibited by Mr. Lancaster represents a simple plan for marking at the target. A second target is placed so near the mantelet that the marker can point to the exact spot on that which the ball has struck on the real target. This seems to supply an excellent means for speedily ascertaining the direction of error in shooting.

† The archers, in the time of Edward VI., were exercised in volley firing, but troops were not afterwards thus practised until our day.

‡ These are clearly set forth in a little shilling volume, called "Regulations for conducting the Musketry Instruction of the Army." (Feb. 1859. Allen. 1s.) The following are some of the most important of these, so far as they affect our subject:—"Ten caps are snapped standing, and the same number kneeling, by each recruit, and a like number of rounds of blank cartridge are fired. The targets are to be fixed, six feet in height and two in breadth, constructed of iron of sufficient thickness to be rifle-bullet proof, having squares of six inches cut on the face of them, to facilitate the marking off of the hits in the diagrams provided for the purpose, as also circular rings of eight inches and two feet in the centre, to serve as guides in painting the 'bull's-eye' and 'centre.' The shots that strike the target are to be denoted by flags of different colours raised above the butt. These flags, together with the number of points fixed as the value of the shots, are as follows:—

IN THE PRACTICES TO 300 YARDS INCLUSIVE.

Shots.	Flags.	Value in points.
Outer...	White or Yellow	1
Centre	Dark Blue	2
Bull's-eye	Red and White...	3
Ricochet	{ Red flag waved in front of the butt ... }	R
Miss ...	{ butt ... }	0

the number of shots to be fired in individual, file, volley, and skirmishing practice; also the marks for guesses in

IN THE PRACTICES AT DISTANCES BEYOND 300 YARDS.

Shots.	Flags.	Value in points.
Outer...	White or Yellow	1
Centre	Dark Blue	2
Ricochet	{ Red flag waved in front of the butt ... }	R
Miss ...	{ butt ... }	0

The number of rounds to be expended at each distance, the distances and number of targets to be fired at by the several classes in individual firing, and the size of the bull's-eye and centre for each class, are as follows:—

THIRD CLASS.

Yards.	Rounds.	
150	5	Two targets, having a bull's-eye eight inches in diameter, and a black circle two feet in diameter.
200	5	
250	5	
300	5	

Fifteen points gained in these ranges are necessary for a second-class shot.

SECOND CLASS.

Yards.	Rounds.	
400	5	Four targets, having a black centre two feet in diameter.
500	5	
550	5	
600	5	

Twelve points gained in these ranges are necessary for a first-class shot.

FIRST CLASS.

Yards.	Rounds.	
650	5	Six targets, having a black centre two feet in diameter.
700	5	
800	5	
900	5	

Seven points gained in these ranges are necessary for a "marks-man."

Ten rounds are expended by each man in file firing. The mark for this practice, and also for volley firing, is to consist of eight targets placed close together, having a separate bull's-eye and centre of the dimensions detailed for the third class. The bullets striking the target in this practice will have the same value in points as in the third class.

In volley-firing, ten rounds of ammunition are to be expended by the recruit, as also by the drilled soldiers of every company annually, at four hundred yards, both ranks kneeling. The hits are to be counted as in the second class, bull's eyes being reckoned only as centres; and in this and the skirmishing practice, care is to be taken that the men of the third class, who have not fired beyond 300 yards, adjust their sights to the proper elevation. In skirmishing practice, 10 rounds of ball ammunition are to be expended by the recruit, and also by the drilled soldiers of every company, annually, in skirmishing order, as per "Infantry Manual," advancing and retiring between 400 and 200 yards, each man judging his own distance, and arranging his sight accordingly. Eight targets, each having its bull's eye and centre of the dimensions detailed for the third class, are to be placed with intervals of six paces between them. Every file is to have its own target, and the hits are to be counted as in volley firing, bull's-eyes being only valued as centres. In firing advancing, the men may fire kneeling, rising to load, which may be executed at the halt, running up to the file leaders after returning their ramrods, and capping after giving the word "ready."

In judging distance drill, the value of the men's answers, by points, in the several classes, are as follows:—

THIRD CLASS.

Or when judging distance between 100 and 300 yards.....	Within 5 yards 3 points
	" 10 " 2 "
	" 15 " 1 "

SECOND CLASS.

Or when judging distance between 300 and 600 yards.....	Within 20 yards 2 points
	" 30 " 1 "

FIRST CLASS.

Or when judging distance between 600 and 900 yards.....	Within 30 yards 2 points
	" 40 " 1 "

Firing without using the Back-sight.—After the annual course of target practice has been gone through, the first and second-class men (if there is any spare ammunition) should be trained to fire at 300 and 400 yards with the flat of the back-sight down, judging for themselves the proper elevation of their rifles."

judging distance, and all the minute details involved in a methodical system. Each man who has fired is then ranked as first, second, or third class, according to precise rules, and the comparative shooting of sections, companies, or regiments, in standing, file, volley, and skirmishing positions, is represented by a "figure of merit."

The foregoing description of the Hythe system, and of the establishment maintained for its application, will not be complete without a brief account of the results.

The method has not yet been in operation long enough to enable us to regard the improved shooting in the army as the measure of its benefits, and we must for the present be content to observe what Hythe has done upon small numbers, as well as in short times. The new arm and the new teaching come to us together, and to appreciate rightly their united advantage, we must recollect what was the weapon, and what was the shooting with it, under olden systems.

The degree of accuracy with which a fire-arm shoots at a certain range may be estimated by firing say 1,000 rounds from a fixed rest, and reckoning either the number of hits within a circle of a certain size, or the mean deviation of all the hits from a centre.

The comparison of these criteria with similar figures when the piece is fired by a man without an artificial rest, would, of course, exhibit the shooting powers of the man as well as those of the fire-arm.

Passing over the days of arquebus and matchlock, we find that old Brown Bess was a very inaccurate arm, and that most of those who used it were very bad shots.

After experiments at Chatham, in 1846, with the musket, it was stated, that at 200 yards half the number of shots (from a rest) missed the target, 11 feet 6 inches wide. (Wilford, p. 80.) At the longer range of 300 yards, it is said, 50 years ago, in "*Scloppetaria*," that in the hands of a good shot "from a musket, not one shot in 300 would, if fired at a single man, take effect." And Col. Wilford thus writes, (p. 81 :)—"It has been stated that the probability of hitting one man with a musket ball at 500 yards would be as one farthing to the National Debt. On a recent occasion, at the Cape, 80,000 rounds were fired to kill 25 men. To put a man *hors de combat* requires his weight in lead, and 6 times his weight in iron." Three miles of target were fired at in Russia and not one shot hit the target.

And with respect also to the rifles used in the army, Baker who made them, for the Rifle Brigade, says, in 1825, "I have found 200 yards the greatest range I could fire to any certainty. At 300 yards I have fired very well at times, when the wind has been calm. At 400 yards and at 500 yards I have frequently fired and have sometimes struck the object, though I have found it to vary much."

The author of "*Scloppetaria*" states that, at 300 yards, firing with a rifle at a single man, one shot in five would tell, "but more likely in skilful hands one in three is a fair average."

Baker gives, as a frontispiece to his book, a six-inch target, used December 11, 1805, when George the Fourth (then Prince of Wales) fired three consecutive shots through the same hole, at 12 yards distance, with one of Baker's rifles. With the same weapon, it was thought splendid shooting to fire, from a rest, 24 consecutive shots at 200 yards, and 34 shots at 100 yards, into a target shaped like a man, six feet high.

A few years later, 12 successive shots were fired (from a rest) into an 18-inch target, at 250 yards, with Moore's rifle.

Chapman, in his "Instructions to Young Marksmen," says, "A first-rate American rifle, with telescopic sights and rest, will throw all its shots into a circle 1½-inches diameter, at 220 yards, and into a circle 8 inches diameter, at 440 yards;" also, that the accuracy of the very best

American rifle, "of the old school," in 1840, is to that of a good rifle, in 1848, as 2 to 5.

To secure this extraordinary perfection (where 10 consecutive shots, at 220 yards, are lodged in a small sized playing card), the rifle has "globe and bead sights," a false or "loading muzzle," placed on the usual muzzle, and a "starter," to secure the position of the ball; the linen patches are moistened and not greased, and the barrel is carefully wiped out and dried after each shot.

From Chapman's book* we learn that with a good American rifle in a favourable time, the performances of a fair marksman with and without a rest would be in the following relations :—

Shooting with a rest is to shooting without a rest

At 110 yards	as 2 to 1.
220 "	2 "
330 "	16 "
440 "	11 "
550 "	30 "

In contrast with the musket and old rifle, we have now to deal with the weapon from Enfield, which has a mean deviation at 500 yards of from 2 to 3 feet.†

And if we could on a considerable scale compare what was done with this weapon by the same men before and after they had been instructed on the Hythe system, the benefit of that teaching would of course be distinctly apparent. As this is not possible, it must suffice to notice a few instances of general results.

In June, 1855, a squad of thirty-five soldiers, after Hythe-teaching with the Enfield rifle, fired at two lines of targets, representing the front and rear companies (30 files in each) of a column fifty yards deep. The men were exercised in marching and other drill, so as to disturb their steadiness. The wind was violent. Each man fired ten rounds, at distances unknown at the time, from 550 to 820 yards, and the result was, that 379 hits were made in the first line of targets, and 238 in the second line. The lines being so placed that no bullet could hit both of them, it follows that out of 1,050 shots fired there were 617 hits, or 58 per cent.

This, it may be said, was not in the heat of battle, but Col. Wilford relates how, in General Wyndham's action, at Cawnpore, a company was pressed by some Sowars, say 70 of them. The Infantry gave them a volley—69 fell in an instant—the remaining man was also shot down at 300 yards.‡

The same officer states, "If at 900 yards you lay down a table-cloth fifty yards square, I would engage with a company of taught soldiers to fill it with balls," and a regiment of 700 men, firing three times in a minute, would in five minutes pour in 10,000 balls.

A general idea may be given of the shooting proficiency of the army by the "figure of merit" of the various corps.

* In America they use wooden targets, 18 inches square, at 110 yards; 24 inches at 165 yards; 36 inches at 220 yards; 48 inches at 330 yards; and 72 inches square at 550 yards. The bull's eye at 220 yards is 7 inches wide, and at 550 yards it is 18 inches wide. To indicate the wind, there are streamers or flags, two inches broad and 6 feet long, on posts 7 feet high, at every 60 yards.

† The earth's rotation of course affects the deviation of a ball fired along a meridian. At a rough calculation, if we fire in this manner (about our latitude), and with a bullet traversing a mile and a half in three seconds, there would be a deviation due to the earth's rotation of about six feet. The mean deviation of the government powder must also be taken into account. Powder for cartridges is rejected at Woolwich unless the mean deviation is under 4 feet, and it is usually from 2 to 3 feet. The powder for 1861, just served out, is very strong and clean.

‡ See "A Volunteer's Narrative of the Hythe Course," by Mr. Edwards, of the 5th Norfolk Volunteers,—an interesting pamphlet.

This criterion is the sum of the averages of points gained in the "first period," and in the file, volley, and skirmishing practice. From the return dated last January, of the "figure of merit" for 1860-1, of the several corps and battalions in the United Kingdom and North America that had gone through their practice, we perceive that there are 75 different regiments or bodies enumerated, and the following are a few instances are selected from this list:—

CORPS.	Figure of Merit.	1st. class men	1st. class in judging distance.
No. 1. 47th Regiment . . .	48.24	47	99
" 2. Scots Fusileer Guards, 2nd Battalion . . .	45.61	34	85
" 3. Grenadier Guards, 3rd Battalion . . .	45.46	52	93
(The next 23 have a figure of merit not below 40.)			
" 29. The 60th Rifles, 4th Battalion . . .	39.74	16	80
" 36. Royal Engineers . . .	38.24	30	76
" 39. Rifle Brigade, 1st Battalion . . .	37.01	15	74
(There are Five Corps with a figure below 30.)			
" 75. Royal Newfoundland Companies . . .	26.97	5	64

The Duke of Cambridge, with reference to this return, expresses his desire to see every regiment attain a figure of merit of at least 40.

The following table is useful as a standard (no doubt a high one) whereby to compare the averages and figures of merit of the various corps.

AVERAGE AND PER-CENTAGE FOR 1858-9, AT HYTHE.

DISTANCE.	Average Points per Man.	Per centage of hits to rounds fired.
*150 yards. . . .	5.94	85.01
*200 "	4.80	72.04
*250 "	3.72	59.03
*300 "	3.25	54.25
400 "	3.44	61.21
500 "	2.67	48.69
550 "	2.07	41.88
600 "	2.21	40.26
650 "	2.31	40.46
700 "	2.26	40.77
800 "	1.39	24.34
900 " . . . .	.75	13.95
1st Period	18.36	
File Firing	10.74	80.81†
Volley Firing	9.89	76.22
Skirmishing	5.46	39.00
Total or Figure of Merit.	44.45	

It is interesting also to compare the shooting of the Volunteers and of the soldiers instructed at Hythe, although the "figure of merit" is, of course, improved in the case of soldiers by their previous platoon drill, especially in the file, volley, and skirmishing practice.

* The averages at these distances include every shot fired in 1st, 2nd, and 3rd periods, up to 300 yards.

† Misprinted 08.81 in a book sold at Hythe.

By the obliging kindness of Captain McKay, of the School of Musketry, I am enabled to present the following statement:—

	Officers.	Non-com. & Privates.	Volunteers.
Figure of Merit of each party, of detachments, and class of officers and volunteers, since the present system of practice came into operation, to 30th April, 1861, at Hythe	46.08 46.94 45.62 42.53 41.44 46.71 44.43 45.22 48.98	43.97 44.35 42.62 42.54 38.07 42.07 44.16 46.31 44.19	... ... 47.07 43.29 45.00 47.11 42.59 45.02 46.70
Average of seven parties ...	45.12	42.85	45.25

It is evidently desirable that we should be able to compare men's shooting by some other measure than the "figure of merit," however useful that may be as a rough standard for purely military efficiency.

To afford a convenient and fair criterion, is by no means an easy matter, for in estimating the accuracy of the shooting of a party of men, there are evidently several data which have all to be considered.

Setting aside even the judging of distance, and the file, volley, and skirmishing practice, and supposing the targets, positions, marking, and other rules to be according to Hythe regulations, the proficiency, with a certain rifle and ammunition, will be evidenced by a compound standard, comprising:—

1. The highest scores at each range.
2. The highest scores in each period.
3. The highest scores of individuals.
4. The percentage of marksmen, 1st, 2nd, and 3rd class men.
5. The number of points standing, and numbers of points and of hits kneeling, compared with the totals of "possible scores."
6. The season of year, time of day, state of the weather, direction, force, and nature of wind,* the amount of practice at the same butts, and the position of the targets.

The relative values of some of these data may yet be agreed upon so as to constitute a shooting figure, or "Rifle monogram," for instant significance. Meanwhile, a comparison of the shooting of different bodies or individuals, or of the same at different times, has to be made by stating the foregoing circumstances, separately and without any conventionally established relation among them.

And here let me again insist positively upon the unfairness of applying merely the number of points or of hits as the sole test of shooting, when all the other variable circumstances are neglected.

We might almost as well compare the sailing of two yachts in different rivers or on different days, as the shooting of two men on separate occasions or at different butts, or with different arms. Under this protest, let me call your attention to the following diagrams compiled from information supplied by Captain McKay.

* The wind affects the ball in its flight in a manner which can only be estimated by careful experiment. The same cause also affects the steadiness of the rifle as it is being fired, and to obviate this, Lord Elcho has invented the weather screen now produced.

GREATEST NUMBER OF POINTS MADE IN FIVE SHOTS AT THE SEVERAL RANGES AT HYTHE BY INDIVIDUALS BELONGING TO CLASSES OF OFFICERS, OF NON-COMMISSIONED OFFICERS, AND PRIVATES, AND OF VOLUNTEERS, BEFORE DECEMBER, 1860:—

Number of Points. } Yds. {	1	2	3	4	5	6	7	8	9	10	11	12
150 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
200 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
250 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
300 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
400 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
500 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
550 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
600 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
650 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
700 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
800 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—
900 { O. ... M. ... V. ...	—	—	—	—	—	—	—	—	—	—	—	—

Here the highest score at each range is indicated by the unbroken line (Officers); broken line (Non-Commissioned Officers and Men); and line of - (Volunteers).

The two Volunteer courses of December, 1860, and April, 1861, are not reckoned in the above.

In the course, 1861, twelve points were made at 150 yards, eight at 400 yards, seven at 500 yards, and five at 700 yards.

In that of December, 1860, nine points were made at 300 yards, seven at 550, and five at 900.

I am not aware that the recent military course made any improvement on the figures in the table.

If these additions be made to the table, it appears that the maximum score at any range of the officers, men, and volunteers, was equal at 300 and at 500 yards.

The officers beat the men at 150, 550, and 800 yards.

The men beat the officers at 400, 650, 700, and 900 yds.

The officers beat the Volunteers at 250, 600, 700, and 800 yards.

The Volunteers beat the officers at 200, and 900 yards.

The men beat the Volunteers at 250, 400, 600, 650, and 700 yards.

The Volunteers beat the men at 150, 200, and 550 yds.

On the whole, the men beat the officers by one range, and the officers beat the Volunteers by two ranges, out of twelve ranges. The Volunteers beat both officers and men at the short range of 200 yards, which is that selected for the National Rifle Association Meeting of 1861.

The Wimbledon meeting of 1860 was under circum-

stances totally different from the practice course at Hythe, and it would, therefore, be very fallacious to compare the shooting at Hythe and at Wimbledon.

It may be mentioned, however, that in the shooting for the Whitworth rifles, when 299 competitors contended, the maximum scores in five rounds, at the three ranges, were as follows:—9 points at 300 yards; 7 at 500 yards; 6 at 600 yards. All the scores at Hythe and Wimbledon, even the best of them, have been frequently surpassed in different parts of England and Scotland, but it is obviously beyond the limits of this paper to give an account of the shooting in general, either of the volunteers, of private individuals, or of the army.

When we consider, however, that there are 691 officers of the army who are certified as first-class instructors of musketry, and 194 as second class, about 900 in all (besides the non-commissioned officers and men), and that not 500 volunteers have passed through the short Hythe course, it is remarkable that the average figure of merit of the volunteers exceeds that of the army, while the number of maximum points at ranges falls very little short of the corresponding criterion of the military courses.

A generous rivalry in target practice between the two services will, no doubt, improve the shooting of both.*

The following table shows the number of points made at the kneeling ranges by the best shots as prizemen, at Hythe, in the seven courses of Volunteers:—

		Second Class.	First Class.	Total.
Sergt. Hoare, 9th Gloucester (6th Course).	points	18	18	36
	hits...	13	14	27
Capt. Mac Gregor, London Scottish (6th Course).	points	16	15	31
	hits...	15	13	28
Capt. Fordyce, † 5th, Aberdeenshire (7th Course).	points	22	8	30
	hits...	17	7	24
Mr. Fielder, 8th Middlesex (2nd Course).	points	16	13	29
Lieut. Muir, 3rd Peebleshire (7th Course).	points	16	12	28
	hits...	16	11	27
Mr. Coulborn, 11th Lancashire (3rd Course).	points	16	11	27
Lord Fielding, 4th Kent (5th Course).	points	12	14	26
Mr. Warren, Oxford University (1st Course).	points	13	11	24
Mr. Wells, 23rd Kent (4th Course).	points	14	10	24

The highest score made in the 1st class alone was that by Mr. Hoare, recorded above. The highest in the 2nd class alone was 21 points, by Captain Pipon, of the 7th Sussex. The highest score made in the 3rd class was 36, by Ensign Oxley, 4th Surrey, 7th course.

The foregoing sketch of the rifle instruction at Hythe is presented with diffidence, as by no means a sufficient description of that admirable institution. The subject courts examination, for the rifle is becoming every day more interesting to Englishmen, more powerful to defend their homes, more formidable to deter their enemies.

The bravery of the army has never failed us, but with this new weapon it is more than ever strong. The navy cased in steel has a hailstorm of iron ready for our foes. At a modest distance, but with rapid strides, the volunteers

* A match took place on April 20 between a company of the 78th Highlanders and the 3rd Midlothian volunteers, when 12 of the Highlanders, at 200 and 250 yards, 5 rounds at each, made 122 points, and 12 of the volunteers made 127 points. The Harrow School-boys make good shots. One scored 17 in the 2nd class, another 30 in the 3rd class, lately.

† Captain Vernon (18th Worcester) scored (2nd class) 18, and (1st class) 14, total 32; but he was disqualified for the prize, having inadvertently used a rifle found afterwards to have a trigger too light in the pull.

are pressing on. With these three, each at their post, old England is well defended.

Relying on God's help, we shall fight for justice, freedom, and peace, and woe be to the rash invader that sets foot on British ground.

DISCUSSION.

The CHAIRMAN said it was now his duty to invite gentlemen present to offer their remarks upon the interesting paper they had heard from Captain MacGregor, and to discuss generally the question which had been brought before them, viz., the system of instruction given at the School of Musketry at Hythe.

Mr. THOMAS SCOTT said, with the permission of the Society he had placed on the table a regulation Enfield rifle, with a new trigger, which realised, in a way that had never been done before, one of the most essential points inculcated in the admirable course of instruction at Hythe, namely, "squeeze off the trigger," so that the aim taken might not be disturbed by the act of firing. Colonel Wilford had embodied this point in one of his many happy expressions, as Captain MacGregor had stated, "let this squeeze be applied as if extracting the last drop from an orange." Now, with the present form of trigger, and a minimum pull of 6lbs., this was literally impossible, although they were all aware that the nearer it was approximated the better the shooting. Although all the gentlemen present might not have had the advantage which Captain MacGregor and himself had had, of undergoing a course of instruction at Hythe, yet so many volunteers had now been there, and in their turn had imparted these instructions to their respective corps and companies, that he presumed the Hythe principles and positions were pretty generally understood. And he would put it to those so informed, if it was possible for all men with different lengths of arms, and differing in other respects, to assume those positions and carry out those principles (although the best yet known) with regulation rifles of an uniform pattern. As the clothes were fitted to every individual soldier, so it appeared to him ought the more important part of his equipment—his rifle—to be. When a short-armed man took his aim with the present Enfield, and then attempted to lay hold of the trigger, away went his aim to the left; then when he fired he pulled it back again, and away went his shot to the right, or perhaps he made a ricochet. But the rifle he (Mr. Scott) produced required no pull, being fired by simple pressure from the finger, which was directly counteracted by the thumb. By adopting a mean point for the trigger, any length of arm could be accommodated, but it would probably be better to vary this point and adopt two or three different distances from the butt, so that by this arrangement the regulation rifle, unaltered in all its other parts, might be adapted to long, medium, or short-armed men. The simplicity of this trigger was also so great, that in superseding the common trigger and trigger guard, about sixteen of the twenty-six operations involved in making them were saved. The stock was also strengthened, as no part of it required, as at present, to be cut away, and the projection he (Mr. Scott) had adopted, enabled the rifle to be carried at "shoulder arms," the same as if supported in the hand by the present trigger guard. But these were mere points of mechanical contrivance and adaptation, and were quite unimportant compared with the principle of the invention, which enabled the left arm to be kept perpendicular in all cases, and the right arm horizontal, forming, firstly, a perfect support for the rifle; secondly, a perfect bed for the butt; and thus enabling anyone to carry out with ease the Hythe instructions in shooting. The pull, or rather pressure, of this new trigger was about six pounds, which was too strong for ordinary fingers, and it was made so to meet General Hay's requirements; but on showing it to General Hay, he said his stipulated minimum of six pounds applied to the common trigger, which was exposed, and thus liable to accidents; whereas this new trigger was

not exposed, and might, therefore, be reduced to one-half its present pull. He thought the exhibition of this rifle might be interesting to his brother volunteers and others; and, should it be generally adopted, he was sure it would lead to improved shooting. The best proof he could give of this was, that he yesterday used it for the second time in competition with six marksmen, and six other members of the London Scottish Volunteer Corps, on Wimbledon Common, and although himself an indifferent shot, he made the highest score at every range from 200 to 600 yards, with the exception of that made by the well-known shot, Ensign Dunlop, at one range. He therefore claimed for this trigger the following advantages:—1st, That a correct position can be maintained by men with arms of different lengths. 2nd, That it is less liable to accident. 3rd, That the stock is made stronger. 4th, That it renders the rifle cheaper. 5th, That it possesses greater simplicity than the present rifle, a thing most important to all, but especially to volunteers who could only give a limited time to instruction in its use.

Mr. PHILLIPS (musketry instructor to the West Middlesex Volunteers) begged to inquire whether the noble chairman had heard of the stadium invented by Sergeant Hill, for measuring distances. It had been found of great use in his own corps in their practice in the park. It was an apparatus quite as portable as the triangular rest upon the table; and by its means they were enabled to measure distances with fair accuracy. It avoided the carrying of heavy chains and other apparatus, and effected the object much more readily.

Mr. YOUNG called attention to an electric target, the invention of M. Chevalier, which was exhibited last year at Beaufort House, and might be seen in operation at the present time at Aldershot and Woolwich. It appeared to him the most effective plan of any he had yet seen, inasmuch as, in the 300 yards practice at Woolwich, the part of the target struck by the shot was registered before they heard the sound of the bullet striking the target. Some officers of the Russian Government were so much struck with it that they gave instructions to have the system arranged for targets for common practice. He believed Lord Vernon had had one of these targets fitted up at Liverpool. As far as practical efficiency went, he (Mr. Young) thought it was the best he had seen.

Lord VERNON remarked that he had one of M. Chevalier's targets in operation, which gave great promise of good results. It was, however, in some respects liable to get out of order; but in spite of the mechanical defects to which he had alluded, he must say, in justice to Lieut. Chevalier, that he considered his invention a very valuable one. When he first saw one of these targets he expressed a hope to Lieut. Chevalier that he might one day succeed in making a great improvement in it, which would be that of having a miniature target or dial at the shooting place, on which would be shown at once, and not only shown but marked, the exact position of the shot on the real target.

Mr. W. E. NEWTON would call the attention of the meeting to a recent invention, brought forward by Captain McNeill, of the Liverpool Artillery Volunteers. It was a target, which in his (Mr. Newton's) opinion answered all the requirements that could be expected from an apparatus of that kind. It consisted of two or three plates of iron, of sufficient thickness to resist the impact of the bullet. The plates were fastened into a wooden frame, and behind the plates were arranged a series of hammers, which were connected with an apparatus which set clock-work in motion, causing a flag to come up so as to indicate what part of the target was struck. This apparatus was constructed upon the well-known principle that if they struck an iron plate with a hammer, and placed a hammer behind it, it caused a rebound from the plate. In this target, the blow of the bullet striking the target caused the hammer behind it to rebound, which produced a mechanical action sufficient to detach a detent, and allow the clock-work to throw up a flag, or some other indicator, which could be seen from

a long distance. It was so contrived that immediately after the indication was given, the flag returned to its former position. As far as he was at present able to judge, it appeared to be a very efficient apparatus for the purpose, and was not liable to get out of order.

Mr. YOUNG added that the plan of hammers had been introduced into the apparatus of M. Chevalier, instead of springs, by which the difficulty of the plate canting from a blow on the side of the target was obviated. This removed an objection which was felt to exist in the first instance.

Captain BRIDGEMAN remarked that with regard to both the targets just spoken of, he did not see how they could distinguish between a good shot and a bad one. A ball might ricochet and yet strike the target so as to be registered by the red flag, whilst a ball which hit the same point would do no more. He thought, by such indefinite modes of indication as these appeared to be, the merits of the shooting could not be displayed.

Mr. WAGSTAFF said the practice of the North American Indians was to fire the rifle from the muscle of the arm, holding the weapon away from the body, so that the aim was not affected by the motion of breathing. The stock of the rifle was made half-moon shaped, which fitted the muscle of the arm. The Hythe principle appeared to be to keep the rifle as close to the body as possible, in which position he apprehended the motion of the chest in the act of breathing would affect the steadiness of the aim.

Mr. THOMAS SCOTT remarked that it was the practice of experienced marksmen to hold the breath during the time of taking aim and firing, which only occupied a few seconds.

Mr. WAGSTAFF apprehended that the operations of sighting and aiming were not momentary. There was this to be said in favour of the rifle, that it did not require to be held with the same amount of stiffness that was necessary when a charge was used that produced considerable recoil.

The CHAIRMAN inquired whether the practice alluded to existed amongst the American Indians at the present time.

Mr. WAGSTAFF replied in the affirmative. The whole of the back-woodsmen used the rifle in that way.

The CHAIRMAN suggested that with the rifle in that position the recoil was liable to inflict injury upon the muscles of the arm.

Mr. WAGSTAFF replied that there was no recoil from those rifles.

Captain MACGREGOR remarked that the American rifles alluded to were three times the weight of those used in this country.

Mr. BLACKIE begged to inquire whether it was customary at Hythe to use the same charge of powder for all distances?

The CHAIRMAN replied that the Government regulation cartridge was used in all cases.

Mr. BLACKIE suggested that, if a bullet took effect at a distance of 1,000 yards, the charge for less than half that distance should be proportionally reduced.

The CHAIRMAN said the simple answer to that proposition was, that when a man loaded his rifle he could not tell whether he would have to fire at the enemy from 200, 500, or 1,000 yards' distance.

Mr. BLACKIE further suggested that charges might be prepared for each distance.

The CHAIRMAN remarked that that would be almost as slow a process as that which Captain MacGregor had described as prevailing in 1605.

Captain PAGE said he had been led to ask the question of Mr. Wagstaff how they were to manage to fire in rank upon the method adopted by the Red Indians. It might answer for separate firing, but he thought it could hardly be adopted as an army position at the Hythe School.

Mr. WILLIAM HAWES thought the discussion upon this paper might be considered as almost closed. The noble chairman had limited the discussion to the subject as it was stated at the head of the paper—viz., on the Hythe

School of Musketry Instruction in Rifle Shooting. This meeting having, as he thought, exhausted that subject, he might be allowed to ask what was the object of all this great expense which they had been told attended this school at Hythe, and what was the end to be attained in placing weapons in the hands of men who were to hit 58 per cent. of those whom they fired at, instead of, as in former times, only one shot out of 1,200 striking the enemy. If the object of war was to destroy the enemy in the shortest space of time, it was clear that any system of instruction which would enable them to destroy the enemy with certainty must be an advantage to the country. But if the enemy had in his own hands the same class of weapon as they employed they might find themselves in the position in which they would wish their enemy to be, and might be equally soon destroyed. It therefore resolved itself into the question, how far this country was justified in going to any amount of expense so as to place both men and arms in such a position as that they could be surpassed by none and equalled by few. That was the object which they should endeavour to attain, and if the facts were as stated, and he had no reason to doubt them, they had arrived at a position in which they might safely challenge the world. This remark applied not only to the smaller arms, but also equally to the larger ones; therefore they ought not to be dissatisfied when they saw the large sums that were annually voted from the public purse for the proper arming of the service generally, if they believed that this expense was incurred to place them in advance of every other country in the world, so that when the time arrived—if ever it should—they might maintain the same superiority as they had always maintained over any enemy that could come against them. They could not, as it appeared, enjoy the luxury of a perfect system of defence without incurring great cost. On the one hand, they must sacrifice men—and they were very costly—and it was clear the more rapidly they destroyed an enemy, the fewer men they would lose themselves; or on the other hand they must place themselves in such a position as to possess the preponderance of power in their own hands to destroy more of the enemy than he could destroy of them. If that were the case any amount of money they might expend upon the volunteer system would be well spent; and would only be increasing the amount at one period to lesson it at another, because the power they thus created would not be easily destroyed, and would always be more effective than a less efficient and a less well-taught power.

Captain MONTGOMERY wished to bring forward a little more prominently one point which had been mentioned by Captain MacGregor in his paper. Amongst so many matters of interest, one which he thought was of special moment was apt to be lost sight of. It was in truth the moral of the paper, whether in fact Hythe should not be brought to Wimbledon? He had no doubt this paper would lead to the consideration of this question in the proper quarters. The large number of volunteers who had entered themselves for instruction at Hythe showed how inadequate that establishment was by itself to meet the requirements of the volunteers in addition to those of the regular army, and he thought it very desirable that some other similar establishment should be placed upon a proper footing which would give those advantages to the volunteer body which Hythe certainly did to the regular army. He hoped the suggestion would not be lost sight of, but that it would bear fruit before long.

The CHAIRMAN said, whether he agreed with or ventured to differ from any of the remarks which had been made, they would all agree that they were very much indebted to Captain MacGregor for the interesting paper he had read to them. He knew more of Captain MacGregor than most present, for he was an officer in the noble corps which he (Lord Elcho) was proud to command; and he would say there was not a better soldier, a better

officer, or a better man in any way than Captain MacGregor. That was known and fully appreciated in the London Scottish, as well as by all who had the pleasure of his acquaintance. Captain MacGregor was a soldier "to the manner born," for, although a lawyer, he had taken up soldiering with great ardour. He had thought it his duty to come forward, as so many thousands had done, and become a volunteer, and he had thrown himself heartily into the cause. He (the chairman) did not believe there was a better shot, because, though Captain Hoare was first class, as gaining the highest number of points at the longest distance, the best shot in the next distance was Captain MacGregor, of the London Scottish, for which he was awarded a prize rifle, a trophy which his comrades were extremely proud of. Captain MacGregor had given them a most interesting history of the training which soldiers had gone through from various early periods in this and in other countries. He had shown them that strange looking thing like a huge firework at the end of a stick, and also the carbine which was carried by the cavalry soldier at the period of 1495. At the present day a discussion was going on as to the mode in which the carbine could be most conveniently carried, and what description of weapon it should be. There was much complaint of the inconvenience of carrying the carbine. He should like to know what they would say if they had to go out with the carbine of 1495! In addition to the arms used, the paper had treated at some length of the mode of instruction in the use of the arms. They had seen a good illustration of the system of training and instruction for musketry practice in vogue in the year 1695, as exhibited that evening by Sergeant Smith, of the London Scottish. It struck him that there must have been a considerable difference between the volunteers of that day, if they then existed, and those of the present time. At the present day there were a great number of competitors for the position of officers, a great many wished to be sergeants, but if, instead of the comparatively simple drill of the present day, they had to go through the 40 positions for platoon exercise as in 1625, there would hardly, he thought, be so eager a desire for promotion as now existed. But one might predict—as he had no doubt the London Scottish would exist for many centuries to come—if in the year 1961 a Captain MacGregor—no doubt a direct lineal descendent of his gallant friend on his right—if there should be a Captain MacGregor of that day giving a lecture on the musketry-practice of 1961, and the positions which riflemen had to assume, he would contrast the drill of the present day with the drill of 1961; and he was much mistaken if, instead of all they had now to go through, there was not some system much more simple. He held in his hand the breech-loading rifle of the present day. Having exhibited the rapid method of loading Westley Richards' breech-loading rifle, his lordship went on remark, that though he did not pretend to enter upon the question of the comparative merits of different descriptions of arms, yet he should not be surprised if in this generation they saw the breech-loader more generally adopted. Some years ago an order had been issued for the supply of several thousands of that description of weapon to the army, for the purpose of experiment as to the action of wear and tear in different climates—for England's empire was in every climate of the globe. He had no doubt the drill might be simplified; but Capt. MacGregor had deservedly praised the system of instruction at present practised at Hythe. Captain MacGregor was, in himself, an instance of the excellence of that system of instruction, for, if he mistook not, Captain MacGregor, before he became a Volunteer, was not a rifleman; but he went to Hythe, and after a fortnight's instruction, he was the winner of almost the first prize there. That showed the great merit of the Hythe system. They found there congregated, men who had been accustomed to shooting all their lives, and men who never fired a rifle till they went there. When he (the Chairman) went to Hythe, he went as one accustomed to the

use of the rifle in deer stalking, and as a sportsman generally, but there were men in the class with him who had never fired a ball before, and after eight or ten day's training, they beat men who had been accustomed to shooting all their lives. The excellence of the instruction at Hythe consisted in a great measure in the positions. At the same time, he thought there were some points in the old system which were extremely good, and which ought not to be despised in the present day. He particularly alluded to the rest which was formed for the arm by a handkerchief suspended round the neck of the marksman, as exhibited by Sergeant Smith. It was a good and firm position. Whilst he accorded his unqualified approbation to the positions taught at Hythe, he, at the same time, thought there were some others which might be included with advantage. There were positions in which it might be necessary to fire up-hill or down-hill, occasionally lying on the back or on the face; and it was desirable that a rifleman should be taught to shoot in every position which he might be called upon to assume in the field. They had heard, no doubt, of the deer-stalker's position, which was the favourite position of Capt. Ross, the champion marksman at the last competition for prizes at Wimbledon. The noble Lord having shown this position, went on to remark that Capt. MacGregor had stated how much the volunteers were indebted to General Hay, but not only were the volunteers indebted to him, but he deserved well of the whole British nation, for the zeal and intelligence he had displayed as the head of the Hythe establishment. He had done this at a time when the volunteer movement was not so popular as it was at the present day, and when the regular army appeared inclined to look upon the volunteers with a feeling other than that of a fraternal kind—when, perhaps, they thought gentlemen were rushing into the movement with more zeal than endurance—when the idea, perhaps, prevailed, that those who had come forward as volunteers would not be inclined to submit to the disagreeable duties of drill. At that time, General Hay had no doubt as to the soundness and permanence of the movement, and he, along with the Duke of Cambridge, had been the means of uniting the army and the volunteers in a way that would be lasting, and which would always operate for the good of the country. With regard to Colonel Wilford, it was one of the greatest treats that could be enjoyed to attend his lectures upon musketry. They were accustomed to hear about the right man in the right place, and that might truly be said of Colonel Wilford. He might remark that he thought perhaps a little too much attention was paid to long range shooting, rather to the neglect, as he thought, of the shorter distances, and he was happy to find that the National Rifle Association had thought it right to alter the "off-shoulder" range this year from 300 yards to 200 yards. That had been done to show that great importance was attached to short range shooting, and that 200 yards was a better off-shoulder-test than 300 yards, and that the great thing was to teach the volunteer that he was to knock over his enemy at 100 or 200 yards as well as at 800 or 1,000 yards. The importance of that step was shown by the mention made that evening of the fact, that in the late Chinese campaign the soldiers were ordered not to raise their sights at distances less than 300 yards. This was brought about, it would seem, by a regiment having fired over the heads of a troop of Tartars at a distance of 80 yards, and it appeared that the shooting of the French soldiers at short distances was better than that of the English. The French rifles had sights only for distances of 100 or 150 yards. He was aware that some people were endeavouring, wrongly, as he thought, to induce the authorities to form *corps d'élite*, but that would never answer for England, for our troops were sent all over the world, and they must be as qualified to act in New Zealand, or the Cape of Good Hope, as in England itself. Therefore it would not do to have *corps d'élite*, as was the case in the French army. Having alluded to the national benefit which was derived

from the annual gatherings for competition in rifle-shooting, and bespeaking the support of the country at large for the National Rifle Association, his lordship proceeded to remark upon some of the inventions which had been brought forward in connection with rifle practice. Mr. Phillips had alluded to the stadium of Sergeant Hills. It was undoubtedly a good invention for determining distances; but he might mention a more simple arrangement which was adopted by deer-stalkers, who lost more game from misjudging distances than from inaccuracy of aim. This consisted in using a specially constructed telescope, with cross hairs, by means of which the distances could be determined within a few yards. They had heard a good deal that evening about various kinds of targets. Mr. Young had referred to the invention of M. Chevalier, than which nothing could be better, as it saved the trouble of marking as well as the danger to the marker, but it was still capable of being improved upon. It was divided into about seven large squares, and the defect in the marking was this—the particular part of the square struck was not indicated, and, as the squares were large, no really correct guide for the marksman was obtained. This he thought was a defect which required to be remedied. He considered there was an advantage over this in the Swiss target, which marked by means of discs. In the practice with the latter target the marker was hidden in a trench, out of harm's way, and by means of a long line, he was able to make indications upon a smaller target similar to the marks made by the ball. The marks were indicated by displaying white or black patches, as the case might be of a hit on the reverse. At the same time, the system of marking was comparatively vague, as they never knew exactly where they hit. What they wanted at the Wimbledon meeting was an apparatus which would enable the public to judge of the merits of the firing, as well as those more immediately interested in the results. It was very desirable, at a high range, and with a long trajectory, to place the marker beyond the reach of accident. Mr. Scott was, he believed, about to introduce something for that purpose, and he would probably allow the first experiments to be made upon himself personally. Mr. Newton had spoken of a target which, by the action of hammers and clock-work, sent up a flag indicating the position of the target struck. But, perhaps, for ingenuity, the targets of Germany excelled all others. If a centive were hit, two or three figures jumped up, but if the bull's-eye were struck, up jumped the figure of a lady, as if in compliment to the marksman's skill, accompanied by the discharge of small cannon and a general conflagration. Another system, or rather a suggestion, was communicated to him a short time since by a gentleman in Edinburgh. This was termed an acoustic target, composed of different kinds of material, which, by the different sounds emitted by the several metals would indicate the part of the target that was struck. The sound of the bullet striking the target could be heard under some circumstances at a distance of 1,000 yards, and in this case it was suggested that the shot should be indicated by the different rings of the metals. He thought there was something in the suggestion, and had accordingly communicated it to General Hay, at Hythe. Up to 500 or 600 yards distance he thought such a target might be found to answer. In conclusion, he would express his satisfaction at seeing the interest which the people of this country were taking in rifle shooting, as was evidenced by what was going on all over the country. Wherever rifle shooting took place, it created a *furor* amongst the competitors. It was difficult to know what they were to prepare for at the next meeting at Wimbledon, when they had before them the fact, that at a prize meeting at Hythe, a short time since, there were no fewer than 180 entrances, at 2s. 6d. each, for a prize of a four-guinea cup. That was the difficulty they laboured under at Wimbledon. That meeting would very shortly come off, and the Association did not know whether they had to prepare for one

hundred or for two thousand competitors; and if there were volunteer officers present, he wished to point out to them that he did not think the National Rifle Association was met in this matter by the volunteers as it ought to be. They were anxious to make preparation as far as possible for all comers. In the month of March the Association sent no fewer than 1,280 letters to the different volunteer corps in the kingdom, requesting to be informed as to the probable number of competitors that would be sent from each, but they had only received 200 answers out the 1,280; and yet in the next five weeks they had to prepare for all the volunteers who would come up. Having himself taken a deep interest in the movement, he was gratified to see the general interest it had excited throughout the country, which afforded the best guarantee for the continuance of our national freedom for ever. He begged to propose a cordial vote of thanks to Capt. MacGregor for his paper.

The vote of thanks having been passed,

Capt. MACGREGOR acknowledged the compliment.

The Paper was illustrated by the following articles among others:—Matchlocks, from Mr. Bishop, of Bond-street; Rests, from Mr. Lancaster, of Bond-street, and Lord Elcho; Scott's Patent Rifle, by Mr. Thomas Scott; Sight Guards from Captain Jacques and Messrs. Silver; Diagrams from old books in the officers' library at Hythe, and the Great Seal Patent Office Library; Lancaster's Wind Sight; Lord Elcho's Weather Screen; a Lockless Gun from Galway; Card Targets from Captain Coles and Mr. Layton; and Lancaster's Marker's Target. A Uniform of St. Martin's Volunteers, about 1796; Musket and Bayonet, ditto; * Print of the Prince of Wales's Loyal Volunteers Preparing for the Grand Review by his Majesty, October 28th, 1803; Sword and Belt, with Badge of Prince of Wales's Loyal Volunteers; Uniform of Prince of Wales's Loyal Volunteers, were contributed by Mr. Philip Palmer; a Whitworth Rifle, by Mr. Scott; an Odometer by Mr. Newton, of Fleet-street; and several tables of statistics were furnished by officers of the School of Musketry.

The Secretary announced that on Wednesday evening next, May 22, a Paper "On a New Method of Reproducing on Glass and Ceramic Substances any Photographic or other Pictures in Enamel Colours," by Mr. F. Joubert, would be read.

EMIGRATION TO AUSTRALIA.

The Government of Queensland, Australia, have sent over an emigration agent to this country, part of whose business will be to give Lectures on Emigration to the Colony. Such lectures would be given gratuitously to any large Mechanics' or Literary Institutions, in or near London, that are in Union with the Society.

Further particulars may be obtained on application to the Secretary of the Society of Arts.

NEW CONSTRUCTION OF SHIPS.

Two models were exhibited at the *Conversazione* of the Society of Arts, on Saturday, the 4th inst., by the inventor, Mr. John Coryton, in illustration of his "Improved Theory of Naval Tactics." The one is that of a clipper ship, of the

* The weight of the musket is 8½lbs., and the bayonet is 1lb.

same tonnage as the *Great Eastern*, with a view to show the advantages of Mr. Coryton's "Vertical Wave-line" system of construction over the ordinary form in respect of stowage and ventilation. A fair idea of this model may be formed by fancying one of the latest clipper cutter yachts with her keel melting away from the fore-foot, and her body falling in so as gradually to approach the form of her false counter. The principal novelty lies in the use made of the vessel. In common parlance she is intended half her time to sail "stern foremost." When tacking or steaming head to wind, she proceeds, as is at present the custom with her prototype the yacht, double leeboards being stated to give her all the advantages she could have received from an ordinary keel of twice the depth. When going free she sails stern foremost, and according to the inventor's account her draught decreases as her speed increases. Under such circumstances the terms "bow" and "stern" of course become inapplicable, and are accordingly dismissed in favour of the expressions of "weather" and "lee" end. The vessel, bulk-headed in two places, at which the sections form catenary curves, is of laminated iron, decreasing in thickness upwards and towards the ends. The centre of gravity on this system is placed so as to give stability without uneasy motion, since, on the occurrence of a slight lateral displacement, the axis of rotation varies its position so as to prevent any accumulation of oscillating momentum. The absence of all keel renders her, of course, extremely "handy." A peculiar system of self-reefing sails, also the invention of Mr. Coryton, adapts the marine structure to the novel requirements made upon it by his theory of navigation.

An arrangement, termed an "Atmospheric Guide-propeller," is exhibited in connection with the second model, that of a thirty-foot life-boat. This consists of bell-mouthed tubes—one set on each side—for pumping water in and out; the current on either side can, by a very simple arrangement, be instantaneously reversed, and thus the vessel is propelled and steered by a single hand. In this life-boat the propelling power is exerted by men hauling on an endless rope which works the pumps. The "weather" end is a water-tight compartment, on the principle of Francis's Life-car. There are no thwarts, but seats extending round the remaining part of the boat. The arrangements as regards buoyancy, are very similar to those adopted in the boats of the Royal National Life-boat Institution. The ballast consists of two large iron bars fixed to the bottom of the boat, below the propelling-tubes, and a block of glass, or lead, moveable by a chain, under the deck of the compartment at the weather end, by which any casualty, such as turning "end over end," may be avoided. The boat is launched upon a carriage, which sinks by its specific gravity as the boat floats.

Home Correspondence.

THE ADULTERATION OF FOOD.

SIR,—In the discussion upon my late paper on the above subject (*Journal* for February 1st, 1861), I think it was stated that, in tea adulterated with *valonia*, the latter is extremely difficult, if not impossible, to detect. I was not, at the time, prepared to give any detailed information on this point, as, during the last few years, I had only met with two samples of tea containing the substance in question. I now, however, enclose you a specimen, lately purchased in Westbourne-grove,* for the inspection of any gentleman interested in the matter.

Examined by reflected light, under a magnifying power of about 150 diameters, the presence of powdered *valonia* in the tea is readily observed, as the bright crys-

talline aciculae, characteristic of that substance, form prominent objects in the field of view.

On the subject of bread adulteration, I wish to make a few remarks referring to Mr. Versmann's letter, published in the *Journal* of Feb. 15th, 1861. First, with regard to alum. Mr. Versmann quoted Dr. Odling as having examined 64 samples of bread purchased at different shops in Whitechapel, not one of which contained alum, the truth being (*vide Chemical News*, No. 71, page 240), that Dr. Odling only examined samples of bread from forty shops in the Lambeth district, in no more than 9 of which he "was unable to detect the presence of alum," 31 samples therefore being adulterated. Secondly, as to the use of sulphate of copper, I have myself detected its presence in three samples of bread, of which (I have every reason to believe) two were from Vienna, and the other one from Munich. In two samples of London flour also I have found traces of copper, but as in these instances the grain had been affected with the "smut," the copper was probably derived from the "blue-stone," which might have been used as a preventive. Mr. John Horsley, of Cheltenham, has also found copper as an adulterant in the bread and flour of that place.

In my paper before referred to, I spoke of the utter impossibility of obtaining perfectly pure mustard in London, a statement I wish now to modify in a slight degree. I have lately examined four samples of mustard (obtained both from the manufactory and from various retailers) bearing the brand of a manufacturing firm at Worcester. None of these can be said to be adulterated, two being perfectly pure, and the remaining qualities merely containing a very little fine turmeric, added for the purpose of improving the somewhat dingy colour of the ground seeds. This pure mustard has only been introduced into the metropolis very recently—I trust that the article may soon be more generally diffused. I need not occupy more of your space, however, by dilating upon the importance of pure mustard either as a vesicant or for culinary purposes, but will conclude with a word of caution to the general consumer, who should never purchase the condiment loose, as it is then always adulterated, either by the manufacturer or retailer. The only chance of obtaining it "genuine as ground," is to buy it in properly secured tins.

I am, &c.,

WENTWORTH L. SCOTT.

Bayswater, London, W., May 6th, 1861.

FILTRATION AND FILTERING MEDIA.

SIR,—My remarks upon this subject last Wednesday night are not quite correctly reported in the *Journal* of the 3rd inst. On the evening in question I recommended the *platinizing* of the "moulded carbon" blocks or balls, in order to render the same more powerfully absorbent and disinfectant for waters containing larger amounts of organic matter in solution. The platinizing process is neither a difficult nor a costly one, and can be accomplished as readily in a drawing-room as in a laboratory. I also stated that I had found animal charcoal superior, in the long run, not only to the ordinary variety from wood, but also to the various prepared "carbons" derived from coke, coal tar, sugar, &c.

I am, &c.

WENTWORTH L. SCOTT.

Bayswater, W., May 6th, 1861.

LOCAL EDUCATIONAL BOARDS.

SIR,—Allow me to say, in reply to an observation in Mr. Blake's letter, that there can be no doubt as to the advantage of Local Boards being incorporated into the Central Committee of Educational Unions; and though it would be impossible to have on a united committee representatives of every Local Board, each Board could nominate a representative, and the Boards then ballot for a number to be mutually agreed upon.

I am, &c.

BARROW RULE.

Aldershot, May 1861.

* I enclose also the name of the vendor, not for publication, but for your personal satisfaction only.

MEETINGS FOR THE ENSUING WEEK.

- MON. ...R. United Service Inst., 8½. 1. Lt.-Col. Lane Fox, "On a Model illustrating the Parabolic Theory of Projection."
2. Mr. R. T. Pritchett, "A Descriptive Account of the Rifled Arms in the Museum, presented by Foreign Governments."
- TUES. ...Royal Inst., 3. Mr. John Hullah, "On the History of Modern Music."
Statistical, 8. Mr. F. Purdy, "On the Earnings of Agricultural Labourers."
Pathological, 8.
- WED. ...Society of Arts, 8. Mr. F. Joubert, "On a New Method of Reproducing on Glass and Ceramic Substances, any Photographic or other Pictures in Enamel Colours."
Geological, 8.
Archæological Assoc., 8½.
- THURS. ...Royal Inst., 3. Mr. Pengelly, "On the Devonian Age of the World."
Numismatic, 7.
Philological, 8. Anniversary.
- FRI. ...Linnean, 1. Anniversary.
R. United Service Inst., 3. Maj.-General P. Anstruther, "The Electro-Chronoscope, and Trajectory of Balls."
Royal Inst., 8. Professor J. O. Westwood, "On the Metamorphosis of Insects."
- SAT. ...Royal Inst., 3. Prof. Max Muller, "On the Science of Language."
Royal Botanic, 3½.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[From Gazette, May 3rd, 1861.]

Dated 19th April, 1861.

966. J. Ridley, Stagshaw, Northumberland—Imp. in steam generators and superheaters.
967. J. Ridley, Stagshaw, Northumberland—Imp. in cutting apparatus for reaping and mowing machines.
968. J. Ridley, Stagshaw, Northumberland—An improved portable cylinder sifting apparatus.
969. W. Grove, 104, Shoe-lane—Imp. in or connected with cylinder printing machines.
970. F. J. Jones, Aldermanbury—An imp. in braces.
972. J. Jobson, Derby—Certain imp. in apparatus to be employed in connection with Cornish and other similar boilers for the purpose of consuming the smoke.
973. W. Hudson and C. Catlow, Burnley, Lancashire—Imp. in looms for weaving.
974. H. Parkes, Birmingham—Imp. in producing ornamented surfaces of metal and other materials.
- Dated 20th April, 1861.
976. W. Ryder and T. Ryder, Bolton-le-Moors, Lancashire—Imp. in machines for fluting rollers and for shaping metals.
977. M. Smith, Birmingham—Imp. in annealing pots or pans.
978. J. Whitehouse, Birmingham—Imp. in the manufacture of door and other knobs, and the ornaments of the pillars of metallic bedsteads and other articles of like manufacture.
979. J. Pinchbeck, 35, Whiskin-street, Clerkenwell—Imp. in wet gas meters.
980. R. A. Brooman, 166, Fleet-street—Imp. in mills for grinding corn and other grain. (A com.)
981. J. B. J. Noiret, 29, Boulevard St. Martin, Paris—An improved process for manufacturing india-rubber pipes.
982. W. Clark, 53, Chancery-lane—Imp. in ornamenting porcelain and other earthen wares and glass. (A com.)
983. J. Webster, Birmingham—Imp. in manufacturing oxygen gas and obtaining certain other products.
985. J. Waddell, 6, Hill-street, Knightsbridge—Imp. in drums.
986. A. Smith, Daisy Bank, Sedgley, Staffordshire—Imp. in apparatus for ventilating forges and other overheated workshops.
987. G. A. Huddart and J. D. E. Huddart, Brynkir, Carnarvon—Imp. in steam and other engines.
988. A. V. Newton, 66, Chancery-lane—An improved mode of bleaching and refining oils and other fatty substances. (A com.)
989. A. V. Newton, 66, Chancery-lane—Imp. in the construction of liquid meters. (A com.)
- Dated 22nd April, 1861.
990. J. Leech, 68, Margaret-street, Middlesex—Imp. in the manufacture of breech-loading fire-arms, and a new method of attaching the barrel or barrels of a gun to the stock.
994. A. Dugale, Paris—Imp. in centrifugal governors for steam engines.
996. G. W. Holding, 3, Moor-lane, Cripplegate—Imp. in sewing machines (A com.)
998. J. T. Dowling, 21, Frampton Park-road, Hackney—An improved instrument applicable to timekeepers, for presenting to view numerals to indicate time.
- Dated 23rd April, 1861.
1002. T. Y. Hall, Newcastle-upon-Tyne—Imp. in safety lamps, and in domestic grates, stoves, and furnaces.

1006. P. Ward, 2, Clouds-hill-villas, Bristol—Imp. in the manufacture of sulphuric acid.
1008. T. Richardson, Newcastle-on-Tyne—Imp. in the purification of coal gas.
1010. E. H. Bentall, Haybridge, near Maldon, Essex—Improved machinery for cutting or pulping roots to be used as food for cattle.

Dated 24th April, 1861.

1016. E. Woodcock, Forest-hill, Surrey—Imp. in treating flax, hemp, rhea, China-grass, New Zealand flax, plantain, and other vegetable fibres, and in the means or apparatus employed therein. (A com.)
1024. G. H. Birkbeck, 34, Southampton-buildings, Chancery-lane—Imp. in separating or extracting silver from lead. (A com.)
1026. D. Stone, Manchester—Imp. in arrangements or apparatus for preventing water pipes from bursting by the action of frost.
1028. T. Greenwood, Leeds—Imp. in the construction and working of saw frames.

[From Gazette, May 10th, 1861.]

Dated 13th February, 1861.

363. E. Butterworth, Spotland, near Rochdale—Imp. in machinery for spinning and doubling cotton and other fibrous substances.

Dated 25th February, 1861.

480. E. F. Barnes, New York—An imp. in railway chairs, and being a combined chair and splice.

Dated 15th March, 1861.

649. G. Dixon, 26, Cecil-street, Strand—Imp. in ploughs. (A com.)

Dated 16th March, 1861.

673. G. H. Birkbeck, 34, Southampton-buildings, Chancery-lane—Imp. in marine propulsion. (A com.)

Dated 30th March, 1861.

780. G. M. Coppe, 13, Rue Gaillon, Paris—Imp. in machinery for fulling felt hats and other felted goods.

Dated 11th April, 1861.

894. C. N. Kernot, Gloucester-house, West Cowes, Isle of Wight, and M. D. Rucker, 116, Fenchurch-street—Imp. in the method of obtaining ammoniacal salts and other valuable products from liquors or substances containing ammonia, and for utilising the residuum.

Dated 12th April, 1861.

900. S. C. Salisbury, Essex-street, Strand, and J. Turner, Dalston, Middlesex—An imp. applicable to shuttles for the saving of cop waste.

Dated 13th April, 1861.

912. H. Maden and J. Wheeler, Bacup, Lancashire—Certain imp. in machinery or apparatus for spinning cotton, wool, flax, silk, and other fibrous substances.

Dated 15th April, 1861.

920. A. Shanks, 6, Robert-street, Adelphi, Westminster—Imp. in machines for drilling and boring metals.

Dated 17th April, 1861.

943. W. A. Dixon, Newport, Monmouthshire—Imp. in plastering walls and ceilings.

Dated 18th April, 1861.

956. A. V. Newton, 66, Chancery-lane—Imp. in machinery or apparatus for cleaning cotton and other fibrous substances. (A com.)

Dated 20th April, 1861.

984. S. B. Haskard, Wollaton-street, Nottingham, and J. Dean and E. Dean, Radford, Nottinghamshire—Imp. in machinery for the manufacture of looped fabrics.

Dated 22nd April, 1861.

991. H. Moore and A. Higgin, Burnley, Lancashire—Imp. in machinery or apparatus for spinning and doubling cotton, wool, flax, and other fibrous materials.

992. T. P. Hawker, Plymouth—Imp. in the manufacture of cartridges.

993. E. D. Bourne and P. Davis, Birmingham—Imp. in certain kinds of cornice poles and curtain rods, and in the runners used in cornice poles and curtain rods, and in the manufacture of tubing to be made into the said cornice poles and curtain rods.

999. C. Carey, Kennington-green, Surrey—Imp. in the apparatus used in making infusions of coffee and other substances.

1000. A. Henry, Edinburgh—Imp. in fire-arms, and in apparatus to be used therewith. (A com.)

Dated 23rd April, 1861.

1001. R. Shaw, Patricroft, near Manchester, and W. Snodgrass, Portlaw, Waterford, Ireland—Certain imp. in machinery for spinning cotton and other fibrous materials.

1003. W. Clark, 53, Chancery-lane—Imp. in looms for weaving stays or corsets, and other similar articles. (A com.)

1005. J. D. Samuda, Poplar—Imp. in the construction of iron vessels of war.

1007. J. Marshall, 4, Richard-street, Liverpool-road, Islington—Imp. in apparatus used for retarding and stopping railway carriages, and in the construction of railway axles.

1009. E. H. Bentall, Heybridge, near Maldon, Essex—Imp. in constructing the framing of various kinds of agricultural implements.

1011. R. Warry, Chatham—Imp. in the construction of breech-loading ordnance, and in the carriages and projectiles used for the same.

1013. M. Henry, 84, Fleet-street—Imp. in telegraphic apparatus. (A com.)

Dated 24th April, 1861.

1014. A. Leighton, 9, Buckingham-street, Strand—Imp. in springs.
1015. S. Handley, Cancell-street, Waltham, Surrey—Improved apparatus for receiving and consuming the residues of candles or other fatty or oleaginous substances.

1017. F. J. Bramwell, 35A, Great George-street, Westminster—Imp. in machinery for spinning fibrous materials.

1018. E. Lecot, 28, Cecil-street, Strand—An improved nose-bag for horses. (A com.)

1019. C. Stevens, 31, Charing-cross—A new artificial manure. (A com.)

1021. W. Lord and J. Hilton, Royton, near Oldham—Imp. in self-acting mules.

1023. F. N. Gisborne, 3, Adelaide-place, London-bridge—Imp. in the construction of electric targets for rifle and gun practice.

1025. W. Wilson, Newcastle-upon-Tyne—Imp. in the manufacture of hats.

1027. E. H. Bentall, Heybridge, near Maldon, Essex—Improved apparatus for transmitting motion to machinery to be driven by horse power.

Dated 25th April, 1861.

1029. G. Scott, Alpha Works, Isle of Dogs—Imp. in steam engines and other apparatus for generating steam.

1031. D. Barker, Clapham, Surrey—Imp. in signalling and in apparatus connected therewith, adapted to communicating from the land to vessels at sea, and also applicable to other purposes. (A com.)

1033. P. C. Lefol, 2, Rue Sainte Appoline, Paris—Imp. in the manufacture of iron wheels.

1034. C. Callebaut, 2, Rue Sainte Appoline, Paris—Imp. in sewing machines.

1035. W. Harris, Villa-street, Waltham, Surrey—Imp. in treating hides and skins to render them suitable to be made into straps for driving machinery, and to be used for other purposes for which leather is commonly employed.

1037. T. Garner, Moorside, Worsley, Lancashire—Imp. in machinery or apparatus for preparing and spinning cotton, wool, flax, silk, and other fibrous materials.

1039. S. Fox, Stockbridge Works, Deepcar, near Sheffield—Imp. in hardening and tempering steel.

1041. J. S. Templeton, Glasgow—Imp. in looms for weaving pile fabrics, such as "furwrap," or "improved patent Axminster" carpeting, and in weaving the same.

1042. H. Hughes, Homerton, Middlesex, and C. Hill, Nottingham—Imp. in the manufacture of rollers for printing, embossing, and otherwise producing designs, patterns, figures, and shapes.

1043. T. Moore, 33, Regent-circus, Piccadilly—Imp. in windlasses worked by cap-tans; also, in the means of stopping or checking the chains in connection therewith.

1044. A. V. Newton, 66, Chancery-lane—Improved apparatus for regulating the water level in steam boilers. (A com.)

1045. S. C. Salisbury, Essex-street, Strand, and J. Stanley, Lewisham, Kent—An improved combination sewing machine.

Dated 26th April, 1861.

1047. C. J. Hill, Coventry—Imp. in the dials of watches and clocks.

1048. R. J. Cole, 11, Fentimbridge-gardens, Bayswater—Imp. in ornamenting the backs of brushes.

1049. E. Newby, 35, Camomile-street, Bishopsgate-street Within—An improved connecting link.

1050. J. H. Brown, Romsey—Imp. in apparatus for lubricating the barrels of fire-arms and ordnance.

1051. F. C. Warlich, 14, London street, Fenchurch-street—Imp. in preparing coal used in the manufacture of artificial fuel.

1052. W. Cowan, Edinburgh—Imp. in gas meters.

1053. E. Strangman, Waterford—An improved system of building or construction applicable to architectural and other similar purposes.

1054. W. Griffith, Upper Sydenham, Kent—Imp. in hooped petticoats, or crinolines.

1055. J. Marshall, Liverpool-road—Imp. in preventing the fracture of metals from crystallization.

1056. J. Delagana, Shoe-lane—Imp. in apparatus for embossing and taking casts or matrices for stereotype and other purposes.

1057. E. H. Joynton, St. Mary's Cray, Kent—Imp. in machinery for the manufacture of paper.

1058. J. Watkins, Birmingham—Imp. in carriage axles and axle boxes.

1059. S. C. Salisbury, Essex-street, Strand, and J. Stanley, Lewisham, Kent—Imp. in sewing machinery.

Dated 27th April, 1861.

1060. J. Poole, 42, Bridge-street, Blackfriars, and W. Milward, Camberwell, Surrey—Imp. in the construction of hoops or tyres for wheels to be used on railways and tramways.

1061. J. Foster, Radford, E. Bramley, and E. Knutton, Nottingham—Imp. in the manufacture of twist lace and in machinery employed therein.

1062. T. V. Morgan, and J. G. Dahlke, Battersea—Certain improved filtering agents, one of which is applicable in the manufacture of crucibles.

1063. J. B. Farrar and J. Farrar, Halifax—Imp. in machinery or apparatus for spinning wool, cotton, silk, and other fibrous substances.

1065. G. G. Ray, Boston, U.S.—An improved penholder.

1066. W. H. Parsons, Butler's-buildings, Cambridge-heath-road, Middlesex—Imp. in machinery for making nuts, bolts, and rivets.

1067. G. M. Story, 2, Coleman-street, and G. W. Edwards, 27, Min-ton-street, Hoxton—Imp. in billiard tables.

1068. H. T. Wedlake, 327, Euston-road—Imp. in harmoniums.

1069. H. Bessemer, Queen-street-place, New Cannon-street—Imps. in projectiles and ordnance.

1070. W. E. Newton, 66, Chancery-lane—An imp. in gas burners. (A com.)

Dated 29th April, 1861.

1071. J. Mash, Manchester—Imp. in steam engines.

1073. J. B. H. Desplas, Harfleur, France—A so-called hypocampa-philie or elastic apparatus, whereby the legs of running horses are protected from accident.

1074. Capt. H. Dixon, 8, Park-end, Sydenham—Imp. in photography.

1075. W. Johnson, Little Malvern, Worcester—Imp. in saddle trees.

1076. W. E. Newton, 66, Chancery-lane—Imp. in desiccating and torrefying farinaceous and other substances. (A com.)

Dated 30th April, 1861.

1078. G. Hulme, Rochdale—An imp. or imps. in the process of carding wool, cotton, silk, or other fibrous materials, and in machinery or apparatus applicable for that purpose.

Dated 1st May, 1861.

1080. T. A. Kendal, 103, Cowley-street, St. George's-in-the-East, and M. D. Rogers, 2, Bow-lane-cottages, St. Leonard's-road, Bromley—An improved chain cable controller for ship's windlasses to prevent riding of cable in paying out and heaving in of same.

1082. I. Hollis, Birmingham—An imp. or imps. in the manufacture of the guards and trigger plates of rifles and other small arms.

1084. R. Laing, Ince, near Wigan, and I. Swindells, Wigan, Lancashire—Imp. in the treatment of certain ores containing metals, and in obtaining products therefrom.

1086. A. E. Holmes, Derby—Imp. in landaus, sociables, and other like-headed carriages.

1092. R. T. Pattison, Daldorch-house, Ayr—Imp. in the means and method of fixing colors in connection with the printing and dyeing of woven fabrics and yarns.

PATENTS SEALED.

[From Gazette, May 10th, 1861.]

May 10th.	
2774. D. Thomson.	3820. T. Welton and E. H. C. Monckton.
2789. R. Furnival.	2822. W. H. Woodhouse.
2794. R. H. Gratrix.	2824. M. L. J. Lavater.
2796. J. A. Bruce and G. H. Cottam.	2826. G. Glover.
2797. J. F. Reeves.	2830. T. M. Jones.
2800. J. Crooke.	2842. R. A. Broomah.
2808. R. A. Brooman.	2860. T. H. Keble.
2816. J. P. Mourguet.	2974. F. Jaques.
	3046. H. Hall.
	444. H. G. Prossor.

[From Gazette, May 14th, 1861.]

May 14th.	
2801. P. Unwin, J. Unwin, and J. U. Askham.	2853. W. Cooke.
2815. J. Stockley.	2859. J. Henry.
2821. R. A. Brooman.	2867. G. E. Dering.
2822. W. L. Thomas and H. Percival de Batho.	2867. G. Macfarlane, W. E. Newton, and R. Carte.
2825. M. A. J. Dahmen.	211. F. W. Webster.
2843. J. Hamilton.	377. P. S. Devlan.
	557. W. H. Haseler.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[From Gazette, May 10th, 1861.]

May 6th.	May 8th.
1023. J. M. Duverd.	1050. G. H. Creswell.
1071. R. Knight.	1058. R. Halliwell.
May 7th.	
1035. W. E. Newton.	

[From Gazette, May 14th, 1861.]

May 9th.	May 10th.
1044. J. M. E. Masson.	1060. J. M. Gilbert.
1055. A. Parkes.	1063. J. Gardner.
1056. A. Parkes.	1111. J. Brown.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[From Gazette, May 14th, 1861.]

May 11th.
1055. J. Platt.